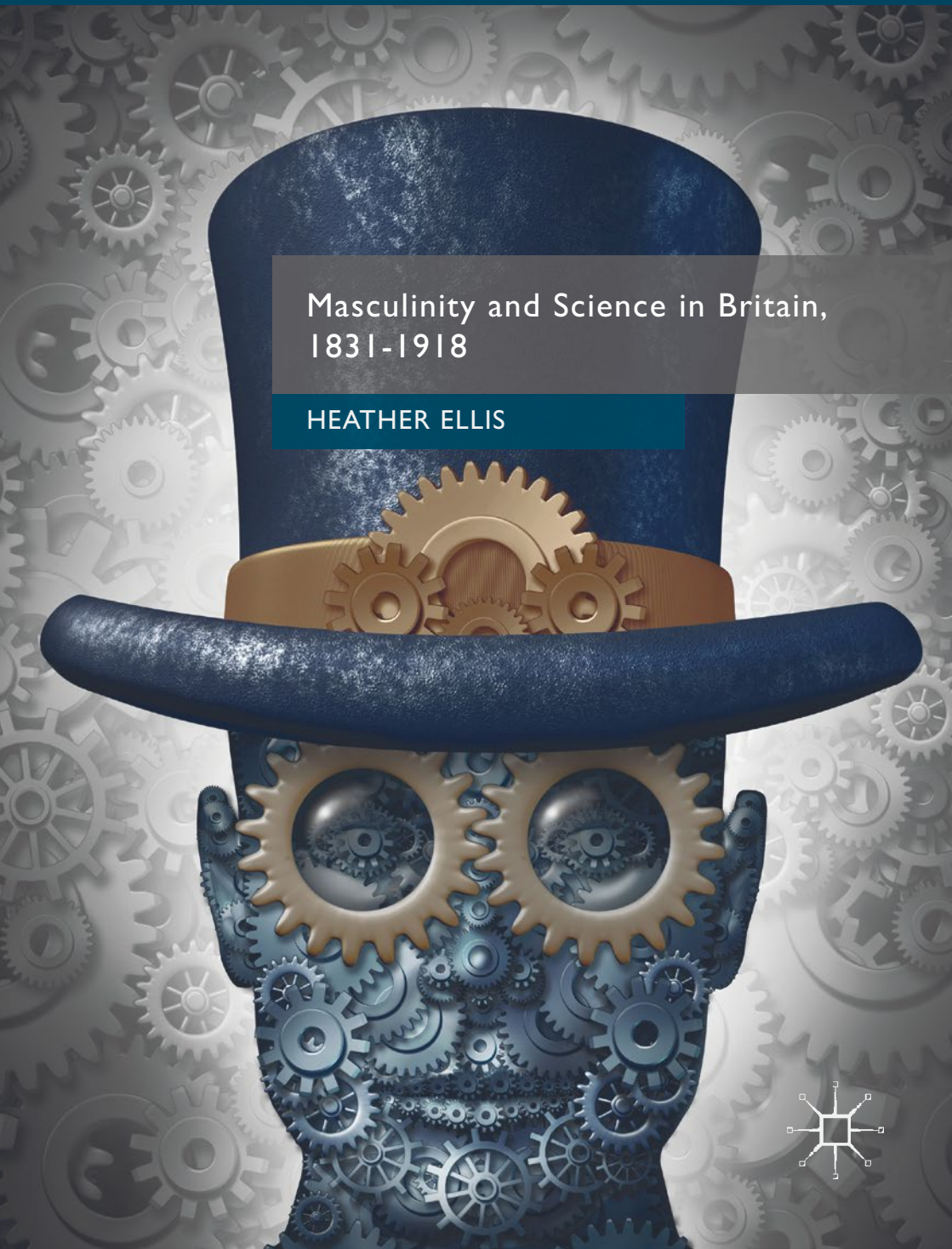
Genders and Sexualities in History



Masculinity and Science in Britain, 1831-1918

HEATHER ELLIS

Genders and Sexualities in History

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Masculinity and Science in Britain, 1831–1918

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For my mother and for my daughter

Series Editors' Preface

In *Masculinity and Science in Britain, 1831–1918*, Heather Ellis tackles some of the most interesting questions in nineteenth- and early twentieth-century Britain: how did the relationship between masculinity and science change over the period and what do those shifts tell us about power, expert knowledge and professional identities? While there is a sophisticated literature on the relationship between femininity and scientific knowledge and practices, there is relatively little on the gendered identity of male scientists and even less on their self-fashioning. In a nuanced analysis, Ellis shows that the 'scientists' were increasingly expected to cultivate certain moral qualities as well as serving as models of manly citizenship. In common with all the volumes in the 'Genders and Sexualities in History' series, *Masculinity and Science in Britain* is a multifaceted and meticulously researched scholarly study. It is an exciting contribution to our understanding of gender and science in the past.

John H. Arnold
Joanna Bourke
Sean Brady

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My greatest debt, as always, is to my family: my husband, Alex; my sons, Leo and Finn; and my daughter, Romy. Together with my daughter, the book is dedicated to my mother, Hilary, who sadly passed away in 2009. Without her love and support over many years neither this book, nor anything else I have written, would have been possible. It is dedicated to her memory with love.

Contents

CHAPTER 1

Introduction: The 'Man of Science' as a Gendered Ideal

Scholarship exploring connections between the history of science and the history of gender in nineteenth-century Britain is not new. Since the early 1980s, pioneering feminist historians like Carolyn Merchant,[1] Evelyn Fox Keller,[2] Londa Schiebinger[3] and Ludmilla Jordanova[4] have highlighted the ways in which scientific knowledge and practices have been deliberately shaped to exclude women. While the actions and identities of men certainly played a significant role in the work of these scholars, the primary focus was necessarily upon women and upon exposing the gender biases of historical systems of scientific knowledge. These works are chiefly concerned not with the formation of masculine identity *per se* as with the construction of narratives of female inferiority through the language, discourse and practices of male-dominated science. The focus remains upon the fashioning of those oppressed and marginalized groups whose voices have often been erased from the historical narrative. Such feminist treatments of the history of science are joined by important works from historians of sexuality like Thomas Laqueur[5] who have analysed the ways in which narratives and systems of scientific knowledge, in particular medicine, have constructed certain groups of men as inferior, diseased or damaged. This has particularly been the case with the history of male homosexuality.[6]

In literatures like these, which have the recovery of marginal voices and, frequently, also the empowerment of groups within contemporary society as a key aim, far less attention has been paid to how the discourse shapers - the, presumably heterosexual, white, upper-class male scientists - fashioned their own identities through the languages and practices of science.[7] Since

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
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their emergence in the early 1990s as distinct fields of historical inquiry, gender history[8] and the history of masculinity,[9] more specifically, have aimed to redress this balance, to give due weight to the ways in which the identities of both men and women with differing levels of power and influence have been constructed through cultural discourse and practice. While historians of masculinity have produced innovative work exploring the formation of masculine identities in many areas of life in nineteenth-century Britain including sexuality,[10] domestic life,[11] schools,[12] universities[13] and the military,[14] the world of science has remained curiously unexamined.

The scholar who comes closest to investigating the gendered self-fashioning of the man of science in this period is James Eli Adams. His 1995 study, *Dandies and Desert Saints: Styles of Victorian Masculinity*, focused specifically on the 'various ways in which male Victorian writers represent intellectual vocations as affirmations of masculine identity'.[15] Just as this book seeks to do, Adams highlighted the tendency of scholars to analyse the 'work of gender in marginalizing women' and to neglect its role in fashioning the identity of men.[16] Indeed, his primary aim in *Dandies and Desert Saints* was to 'explore a contradiction within Victorian patriarchy, by which the same gender system that underwrote male dominance also called into question the "manliness" of intellectual labor'. He examined the ways in which a wide range of 'intellectual vocations' in the Victorian period including 'Tennysonian poetry, Tractarian faith, Arnoldian culture, Paterian aestheticism, even Carlylean prophecy' came to be associated publicly with 'models of feminine activity and authority'.[17] In so doing, he has gone further than many other historians in explicitly questioning the masculine status frequently attributed to intellectuals in nineteenth-century Britain. It is significant, though, that despite his focus on intellectual vocations, the man of science is left out of his analysis.

This omission may be explained in part by the apparent success of male scientists. Historically, they have appeared to enjoy not merely high socio-economic status, but also the considerable advantages of intellectual and medical authority. Viewed superficially, the male scientist appears to be one of the most powerful and secure masculine identities in modern British history. 'The scientist as archetype', writes Jan Golinski, 'has always been male.' He is 'associated with distinctly masculine character traits, whether he is a man of action or cool rationalist, benevolent patriarch or glamorous young hero, saint or devil'.[18] A similar impression of the masculine power and authority of male scientists is conveyed by feminist historians who

have traced the growing exclusion of women from science over the course of the nineteenth century. From this perspective, the obvious accompanying narrative is one of male ascent and the affirmation of masculine authority through scientific discourse and practice. Such narratives usually begin in the late eighteenth century, when feminist historians have stressed the existence of a more equal Enlightenment scientific culture of mixed-sex sociability which then gave way gradually over the course of the nineteenth century to an increasingly male-dominated, professionalized and institutionalized scientific world. From this world, the domestic (and the female) was systematically 'removed', while male scientists were, in turn, 'virilized'.[19] At the heart of this narrative is the British Association for the Advancement of Science (BAAS), which was established in 1831, and provides the institutional focus for this book. Founded by a combination of university scientists, gentleman-amateurs and clergymen, the BAAS was modelled on a German association of scientists, established some nine years earlier, in 1822, and has frequently been represented by historians as a professionalizing institution *par excellence*.[20]

Such analyses, however, are inherently problematic. They construct an image of the male scientist in nineteenth-century Britain as a completely secure masculine persona, in control of discourse, performance, structures, languages and theatres of power. Such narratives, by unnecessarily reifying the masculine authority of scientists, can serve to undermine the efforts of historians seeking to recover the voices and identities of previously hidden female subjects. Ironically, they can make the situation of women appear more intractable than it was and present them as enjoying less agency than they actually had. Potentially, I would suggest, they have also discouraged other historians from attempting a gendered study of male scientists as the story seems to be so well known.

If we turn to the history of science literature, there has been comparatively little interest shown in exploring the masculine identities of Victorian scientists. History of science, as a discipline, has sometimes been criticized for its reluctance to engage with the techniques and research questions of cultural history, including the history of gender and masculinity.[21] For too many works focusing on the history of science in nineteenth-century Britain, including 'gender' in their analysis still means commissioning a chapter on 'women', either the rare female scientists who beat the odds, or, more usually, the supportive but largely invisible 'scientific wives' and female audiences.[22] In addition, many historians of science have largely accepted professionalization accounts of the development of British

science in the nineteenth century, accounts which tend to reinforce and perpetuate the narrative of secure masculine authority.[23]

A fairly recent study which exemplifies this tendency is Charles Withers and Rebekah Higgitt's examination of female audience members at BAAS meetings between 1831 and 1901.[24] The authors argue that women's primary role at the annual gatherings was to act as an appreciative, yet fundamentally passive, audience for men of science, successfully demonstrating their masculine power through their mastery of scientific knowledge, discourse and practice. While the claim that most women attending BAAS meetings had little active agency may be disheartening from a feminist perspective, it is significant for historians of masculinity that the security of male scientists' authority as men is not questioned. Indeed, the authors argue that female audiences acted as a successful 'foil', further enhancing the normative heterosexual masculinity of the male speakers.[25] The lack of attention paid to exploring the masculine identity and authority of male scientists is not restricted to historians working on the nineteenth century, but is also visible among scholars researching much earlier periods. In her work on men or 'bachelors' of science in the seventeenth century, Naomi Zack argues that it was the established masculine authority of science which socially marginalized young men—second or third sons, without property—successfully drew upon to boost their status as men. In this reading, the practice of science becomes an 'emancipatory' project.[26]

Even historians of science, who have carried out research into cultural historical topics including questions of language,[27] performance,[28] and identity formation[29] have shown only a tangential interest in the masculine self-fashioning of male scientists. One article from 1997, written by Hannah Gay and John W. Gay, seems to focus specifically on questions of science and masculinity. Exploring the history of four scientific clubs in nineteenth-century Britain, the authors hoped 'to throw some light on the different masculine ideals held by scientists'. Indeed, they explicitly associated their work with the 'the effort to problematize society and culture in terms of gender' by 'social and cultural historians'.[30] However, despite covering the nineteenth century as a whole, the article does not explore the ways in which gendered expectations of the scientist changed over time. Instead, it describes a rather unspecific (and seemingly unchanging) 'ideal of the good scientist … suffused', we are told, 'with ideals of manliness that emphasized the brotherly and selfless search for truth, the sharing of intellectual property, craft and manual dexterity, self-control, hard work and independence'.[31]

In a later article from 2003, focusing on the history and evolution of the key term 'man of science', Ruth Barton convincingly challenges the professionalization narrative but does not attempt a detailed investigation of the gendered import of the phrase 'man of science'. Although she argues that the term referred primarily to 'qualities of mind and character' and stressed 'the nature of the person rather than the activity undertaken',[32] she still discusses 'only briefly the possible gender implications of "*men* of science"'.[33] More recently, in his 2014 book *Visions of Science*, James Secord has discussed the extent to which science, as a set of discourses and practices in early nineteenth-century Britain, 'was pervasively bound up with defining and maintaining canons of behaviour' among men; yet he does not connect these thoughts with a detailed study of scientific masculinities.[34]

The historian who has arguably done most to highlight the need for more attention to be paid to the 'man of science' as a gendered concept is Jan Golinski, who has written some excellent articles on the self-fashioning of the early nineteenth-century chemist, Humphry Davy.[35] Golinski was among the first historians of science, drawing on the field of interdisciplinary science studies, to apply the techniques of constructivism, in particular Foucault's concept of disciplines, to the task of historicizing processes of identity formation among male scientists.[36] He was likewise one of the first to call for greater attention to be paid to the gendered 'self-fashioning of the scientific practitioner' in both the early modern and modern periods.[37] Arguing over ten years ago now, that '[m]odes of self-presentation within the scientific community were intimately tied to models of masculinity',[38] Golinski has repeatedly urged greater investigation into 'how the identities of the natural philosopher or scientist … have been formed from a variety of cultural resources, including those used to shape masculine identity in society at large'.[39] In exploring how this might be done, he highlighted an earlier collection of essays edited by Christopher Lawrence and Steven Shapin—*Science Incarnate*, published in 1998.[40] The volume's contributors sought to challenge the long-standing idea that 'science is made by people without bodies—by purely mental entities without passions, desires, or gender'. 'To insist', Golinski argued, 'on the contrary, that scientific knowledge was made by embodied human beings, whose masculinity was not entirely accidental to their vocation … is potentially quite subversive of our traditional understanding of science.'[41]

In his own work on the self-fashioning of Humphry Davy, Golinski underlines the importance of what Foucault has termed 'the care of the

self' in the construction of male scientific authority.[42] Drawing on the earlier work of Evelyn Fox Keller and other feminist historians of science,[43] he acknowledges the deliberately constructed nature of the identity of the male scientist and, therefore, its potential instability: 'Command of the natural world by men was thought to depend upon preparatory exercises of self-purification', he writes: 'I take my departure from the point of view that regards male identity as historically variable and potentially unstable, as the product of a range of forces and assumptions that vary in different cultural settings.'[44] In order to show its constructed nature, Golinski repeatedly points to the very different public reactions to Davy's personality and assessments of his masculinity. Though, by the standards of the time, a prominent and successful scientist, Davy was considered by many of his contemporaries to be a 'dandy', a well-recognized 'figure of severely diminished masculinity'.[45] Elsewhere, Golinski records similar charges of effeminacy brought against a veritable 'scientific hero' of the early nineteenth century, Alexander von Humboldt.[46]

Paul White has also pointed to the fragile masculine status of the male scientist in his 2003 biography of T.H. Huxley.[47] Just as James Eli Adams showed that many intellectual vocations in the Victorian period 'came to resemble models of feminine activity and authority',[48] so White describes Huxley's 'ambivalent manhood' as resting on a 'conflation of separate spheres, and of masculine and feminine agencies'.[49] In particular, Huxley is shown likening science to a domestic retreat from the world. 'He was less the man who fought vigorously in the world', White concludes, 'than the one who longed for the tender comforts of home.'[50] Golinski and White have undoubtedly brought the debate forward by highlighting the potential instability of the scientist's masculine status. However, neither has pursued these questions beyond individual case studies. As a result, the criticisms encountered by the men of science they focus on (Davy, Humboldt, Huxley) appear as exceptional, flying in the face of a successfully professionalizing collective norm.

Instead, this book will suggest that it was rather these scientists who constituted the norm. Golinski himself admits that more work needs to be done to establish '[e]xactly *how* the identity of the scientist was shaped by assumptions concerning gender'. At the moment, he writes, 'this remains largely unclear'.[51] Together with Golinski and other historians of science like Naomi Zack, Ruth Barton has called for closer collaboration with both gender studies and gender history and for more work to be done on

the masculine identity construction of male scientists in this period. 'Were "men of science" manly?' she asks: 'Was science a masculine activity?' 'Religious, military, imperial, and anti-aristocratic ideals were appealed to', she writes, 'when men of science described themselves as patient workers, fearless explorers, conquerors of the unknown, disciplined soldiers, and single-minded searchers after truth. Adequate analysis requires a separate article.'[52]

It is calls like these to which this book seeks to respond. It aims to bring together productively two literatures which have traditionally been kept at something of a distance from each other—gender history (including feminist perspectives), on the one hand, and mainstream history of science, on the other—and to apply insights from both in investigating the construction of male scientific identities in nineteenth-century Britain. When it comes to the question of professionalization, which has functioned as the key narrative in feminist historical accounts of the construction of male scientific authority, mainstream history of science scholars offer a very different view. In contrast to feminist readings of the history of the BAAS, accounts by historians of science frequently challenge what they refer to as the professionalization 'myth'.[53] The BAAS, they argue, was not the product of a professionalizing drive among the denizens of British science, a sign of confidence and prosperity in scientific circles; rather, they suggest that science found itself in a weak position culturally in the late eighteenth and early nineteenth centuries. It was composed of a parvenu set of disciplines, not heavily institutionalized and with no real base at the ancient universities. Indeed, as a discourse, science was closely bound up with the traditional image of the scholar, a figure frequently ridiculed as effeminate and reclusive in the decades preceding the foundation of the BAAS in 1831. Much of this ridicule stemmed from the widespread perception that scholars deliberately isolated themselves from wider society and rejected 'normal' gender roles and family relationships. In his work on the oft-associated notions of the 'scholar' and the 'gentleman', Steven Shapin found that despite the superficial congruence of the two identities in the common phrase, they were linked with diametrically opposed values throughout the early modern period. The scholar was seen as socially isolated, priggish and arrogant; the gentleman, by contrast, was sociable, altruistic and self-effacing. It is significant, from a history of masculinity perspective, that neither Shapin, nor other historians of science, have attempted to draw out the important gender implications of these conclusions.[54]

If we read accounts of the foundation of the BAAS by historians of science, the chief impression left behind is that it was born out of a widespread recognition that both science and the man of science had lost their way. Frequently referred to by historians as the 'Decline of Science' debate, these discussions about the state of British science have been much studied. It is important to note, however, that the perceived weakness of science was not widely seen to consist in a lack of professionalization or institutionalization, as in a want of character, energy and moral manliness among men of science. The foundation of the BAAS should not be viewed (as it sometimes has been) as a recognition of strength, or a sign of growing professionalization among men of science, but rather as a daring attempt by leading scientists to reinvigorate a much maligned and misunderstood discourse. Their task was to realize a new vision of the man of science in the public mind—as a figure of masculine authority connected to the real world, entrusted by the public to inform them about scientific progress and to lobby government on their behalf about the need to fund science appropriately. Real advocates of what we would understand as professionalization were few and far between. William Whewell, who is often cited as the originator of the term 'scientist', and who did indeed state that he wished science to become more of a 'profession', was something of a lone voice crying in the wilderness.[55]

Although the main focus of this book is on the construction of male scientific identity in the nineteenth century, it is important to place this analysis within the context of preceding images and ideas of the male scientist, which set the scene for later developments. Chapter 2 thus explores the public image of the male scientist, or natural philosopher, in the early modern period, from the emergence of the 'new science' and the publication of Bacon's inductive method in the seventeenth century, to the close of the eighteenth. In particular, it draws attention to the tendency of feminist scholarship on early modern science to depict the natural philosopher as a source of unquestioned power and authority. While this is understandable in studies whose main focus is not the construction of male identity, but narratives of female weakness, it has arguably contributed to the fact that the masculine authority of scientific practitioners in this period has rarely been questioned. Drawing instead on mainstream history of science treatments of the period, the work of Steven Shapin, in particular, is highlighted. Shapin has argued convincingly that the natural philosopher, in this period, was predominantly associated with the figure of the reclusive scholar, and that this trend persisted despite the efforts of the fledgling

Royal Society to reinvent the man of science as a fashionable gentleman.[56] While not drawing out the gendered implications of this connection with the scholar, Shapin highlights many sources from the time which provide instances of accusations of effeminacy directed against the scientific practitioner arising from his perceived connection with the cloistered scholar.

Having established the insecure nature of the masculine authority of the man of science at the end of the eighteenth century, Chapter 3 takes this argument forward into the new century. In particular, it argues that fears about the masculine image and authority of the man of science played an important role in the oft-studied 'Decline of Science' debate in the 1820s and 1830s. While the establishment of the BAAS in 1831 has frequently been linked with the Decline debate, and the need to raise the public profile and reputation of science, it is argued here that it was an equally important goal of the new body to reinvigorate and reinvent the public image of the man of science. The chapter stresses, in particular, the efforts of the BAAS, in its early years, to achieve what Shapin has shown the Royal Society was unable to do in the seventeenth and eighteenth centuries, namely to successfully combine the man of science with the figure of the gentleman. It argues that the Association worked hard in the first decade of its existence to associate scientific knowledge and practices in the minds of the public with the well-established cultural authority of the aristocracy. This was attempted, it suggests, in a number of ways, from actively courting aristocratic patronage, to appointing prominent nobles as presidents and vice-presidents, and generally cultivating a lavish style of mixed-sex sociability, strongly reminiscent of metropolitan high society.

While historians have generally considered the BAAS as successful in reviving the public fortunes of science by the early 1840s, Chapter 4 suggests that we need to pay more attention to the criticisms directed against the Association in these years. Although some work has been carried out on these attacks, in particular, by A. D. Orange,[57] they have not been analysed from a gender perspective. When looked at through the lens of shifting ideas of masculinity, much of the rancour directed at the BAAS, in particular criticisms focused on the extravagant atmosphere of annual meetings, becomes understandable as the rejection of the model of the scientific-gentleman cultivated by the Association's founders in its first decade. In particular, BAAS members were condemned for their foppish dress and diet, the theatrical nature of their meetings and the large, often predominantly female, audiences who gathered to listen to their discourses. As Chapter 4 shows, ideals of masculinity were undergoing profound change

in the late 1830s and early 1840s as emphasis shifted from traditional aristocratic and military roles to the cultivation of particular moral qualities, in particular, sincerity, humility and self-discipline. Although connected with specific cultural movements, including Romanticism and evangelicalism, these changes should also be viewed as part of a much broader cultural shift from a strictly hierarchical society, based on rank and position, to an increasingly democratic culture where status was ideally achieved rather than ascribed.

Chapter 5 pursues these developments further and explores the emergence of alternative masculine identities for the man of science, both within and outside of the BAAS, in the 1840s and 1850s. Particular attention is drawn to the writings of Thomas Carlyle and his presentation of the experimental scientist as a potential modern hero. Carlyle rejected the figure of the reclusive scholar as exemplifying precisely those traits of self-consciousness and speculation without action, which represented, for him, the effeminacy of the age. The man of science, however, he viewed as engaged in active investigations connected with the practical problems of human existence; and as such he offered hope of a way forward. Chapter 5 concentrates on the influence which Carlyle exerted on the rising generation of scientists, coming to prominence within the BAAS in the 1840s and 1850s. It begins by tracing the development of internal criticism of the aristocratic atmosphere of annual meetings, starting with the founding of the Red Lions dining club at Birmingham in 1839. The club included nearly all those who would go on to become members of the X-Club, often described as the most powerful scientific coterie in Victorian England, including T.H. Huxley, John Tyndall and Joseph Hooker. Through their scientific publications and involvement in educational reform, these men worked hard in the 1860s and 1870s to promote an image of the man of science conforming to Carlyle's ideal of the morally earnest, hard-working and disciplined hero.

As Chapter 5 shows, Huxley and other members of the X-Club succeeded in embedding their ideal of the scientist in the public and grammar school reforms of the 1860s, the new elementary system, introduced from 1870, and in the Devonshire Commission, appointed the same year, which aimed to promote the 'advancement of science' in British education as a whole. Chapter 6, however, argues that we should not see this success as lasting beyond the lifetime of the Club itself. As its members grew older and increasingly out of touch with developments in science, the BAAS experienced a new period of public criticism and diminishing

popular support. The late 1870s and early 1880s saw the publication of virulent attacks directed, in particular, at the Association's physiologists, by anti-vivisection protestors, led by Frances Power Cobbe. Like the critics earlier in the century, they made strong use of gendered imagery in their attacks, above all, the accusation that Association members had spurned the wholesome ideal of the English gentleman, with his manly sensibility to the suffering of animals, in favour of a cold and calculating model of scientific masculinity, acquired during their training in German laboratories. Also looming on the horizon was a new threat to the masculine image of the BAAS—the figure Huxley identified as the 'rich engineer'. With the Association more focused on 'pure' research and the idea of science as a training in character, application of research and the development of technology increasingly took place outside its auspices. Chapter 6 looks, in particular, at the career of Guglielmo Marconi, the pioneer of wireless telegraphy, and his interaction with the BAAS in the late 1890s. It suggests that the demonstration of his technology at the 1899 Dover meeting, in particular, revealed the extent of the loss of public reputation suffered by the Association in the preceding years. The coverage of the event in the press contrasted Marconi's activity and masculine charisma with the increasingly effete and esoteric British Association, whose members were once more likened to reclusive and cloistered scholars.

The final chapter considers the impact of the First World War upon the BAAS and the public image of the scientist. In the years immediately preceding the outbreak of war, the reputation of the Association had reached an all-time low. No longer at the centre of scientific research and development, new discoveries and technologies were revealed to the public elsewhere. Its annual meetings were increasingly viewed, as the engineer, Henry Selby Hele-Shaw, complained, as festive occasions for aging men of science to socialize with their wives and children. Indeed, the outbreak of war itself marked a particular low point for the BAAS as their support for German colleagues, stranded at the 1914 meeting in Australia, and their election of a German-born scientist, Arthur Schuster, as president, called into question their loyalty and patriotism. Following a hostile reaction in the press, prominent members of the BAAS urged a radical change of approach, suggesting the war be viewed rather as an opportunity to prove the valour and usefulness of men of science at a time of national crisis.

By the end of the war, their ideas about how imperial resources might be better harnessed for the war effort and a successful campaign to

promote the practical importance of training a new generation of scientists, had helped the BAAS to transform their public image and that of the man of science. Both the British government and its armed forces acknowledged the invaluable contribution science had made to achieving victory in the war and promised increased support and investment. In the interwar years, moreover, the British Association worked hard (and with considerable success) to promote the man of science, with his dedication and self-sacrifice, as a model of manly citizenship for peacetime. In this way, the male scientist finally achieved the secure masculine status he had been searching for since the Scientific Revolution.

Notes

1. Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (London: Wildwood House, 1980).
2. Evelyn Fox Keller, *Reflections on Science and Gender* (New Haven, CT: Yale University Press, 1985).
3. Londa L. Schiebinger, *The Mind Has No Sex: Women in the Origins of Modern Science* (London: Harvard University Press, 1989); Londa L. Schiebinger, *Nature's Body: Gender in the Making of Modern Science* (New Brunswick, NJ: Rutgers University Press, 1993).
4. Ludmilla Jordanova, *Sexual Visions: Images of Gender in Science and Medicine between the Eighteenth and Twentieth Centuries* (London: Harvester Wheatsheaf, 1989).
5. Thomas Laqueur, *Making Sex: Body and Gender from the Greeks to Freud* (London: Harvard University Press, 1990).
6. See, for example, John Rutledge Martin, *'Sexuality and Science: Victorian and Post-Victorian Scientific Ideas on Sexuality'* (PhD dissertation, Duke University, 1978); Jeffrey Weeks, *Sex, Politics and Society: The Regulation of Sexuality since 1800* (London: Pearson Education, 1981); Jeffrey Weeks, *Against Nature: Essays on History, Sexuality and Identity* (London: Rivers Oram Press, 1991); Vernon A. Rosario, *Homosexuality and Science: A Guide to the Debates* (Oxford: ABC-CLIO, 2002); Paul Peppis, *Sciences of Modernism: Ethnography, Sexology, and Psychology* (Cambridge: Cambridge University Press, 2014).
7. It is important to stress that in this book I am chiefly concerned with the gendered self-fashioning and self-perceptions of elite male

scientists—those who ultimately shaped the scientific discourses which did so much to delimit and exclude other groups, not only of women, but also of men—homosexual men, men of colour and working-class men to name but a few.

8. On the development of gender history, see, for example, Joan Wallach Scott, *Gender and the Politics of History* (New York: Columbia University Press, 1988); Sonya O. Rose, *What is Gender History?* (Cambridge: Polity Press, 2010); Susan Kingsley Kent, *Gender and History* (Basingstoke: Palgrave Macmillan, 2012).
9. On the development of the history of masculinity, see John Tosh, 'What Should Historians do with Masculinity? Reflections on Nineteenth-Century Britain', *History Workshop Journal* 38:1 (1994), pp. 179–202; Karen Harvey and Alexandra Shepard, 'What Have Historians Done with Masculinity? Reflections on Five Centuries of British History, circa 1500–1950', *Journal of British Studies* 44:2 (April 2005), pp. 274–280; John Tosh, 'The History of Masculinity: An Outdated Concept?', in Sean Brady and John Arnold, eds., *What is Masculinity? Historical Dynamics from Antiquity to the Contemporary World* (Basingstoke: Palgrave Macmillan, 2011), pp. 17–34.
10. See, for example, Sean Brady, *Masculinity and Male Homosexuality in Britain, 1861–1913* (Basingstoke: Palgrave Macmillan, 2005).
11. See, for example, John Tosh, *A Man's Place: Masculinity and the Middle-Class Home in Victorian England* (London: Yale University Press, 1999).
12. See, for example, J. A. Mangan, *Manufactured 'Masculinity': Making Imperial Manliness, Morality and Militarism* (London: Routledge, 2013); J. A. Mangan, *Athleticism in the Victorian and Edwardian Public School* (Cambridge: Cambridge University Press, 1981).
13. See, for example, Paul R. Deslandes, *Oxbridge Men: British Masculinity and the Undergraduate Experience, 1850–1920* (Bloomington: Indiana University Press, 2005); Heather Ellis, '"Boys, Semi-Men and Bearded Scholars": Maturity and Manliness in Early Nineteenth-Century Oxford', in Brady and Arnold, eds., *What is Masculinity?*, pp. 263–282.
14. See, for example, Heather Streets, *Martial Races: The Military, Race and Masculinity in in British Imperial Culture, 1857–1914* (Manchester: Manchester University Press, 2004); Jessica Meyer,

Men of War: Masculinity and the First World War in Britain (Basingstoke: Palgrave Macmillan, 2008).

15. James Eli Adams, *Dandies and Desert Saints: Styles of Victorian Masculinity* (London: Cornell University Press, 1995), p. 2.
16. Ibid., p. 1.
17. Ibid.
18. Jan Golinski, 'Humphry Davy's Sexual Chemistry', *Configurations* 7:1 (1999), p. 15.
19. See Keller, *Reflections on Science and Gender*, p. 40; Jan Golinski, 'The Care of the Self and the Masculine Birth of Science', *History of Science* 40:2 (2002), p. 140.
20. For the debate surrounding the BAAS as a professionalizing body, see, for example, H. Brock, 'Advancing Science: The British Association and the Professional Practice of Science', in Roy M. McLeod and P. D. B. Collins, eds., *Parliament of Science: The British Association for the Advancement of Science 1831–1981* (Northwood: Science Reviews, 1981), p. 91; J. B. Morrell, 'Individualism and the Structure of British Science in 1830', *Historical Studies in the Physical Sciences* 3 (1971), p. 184. Cf. Basalla, Coleman and Kargon who concluded from their analysis of the early presidential speeches of the BAAS that '[a]bove all, the British Association was a professional organization as compared to the amateur Royal Society'. See George Basalla, William R. Coleman and Robert Hugh Kargon, *Victorian Science: A Self-portrait from the Presidential Addresses of the British Association for the Advancement of Science* (New York: Doubleday, 1970), p. 8.
21. On this, see, for example, Jan Golinski, 'Introduction: Challenges to the Classical View of Science', in Jan Golinski, *Making Natural Knowledge: Constructivism and the History of Science* (Cambridge: Cambridge University Press, 1998), pp. 1–13.
22. See, for example, Londa Schiebinger, 'The Philosopher's Beard: Women and Gender in Science', in Roy Porter, ed., *The Cambridge History of Science Volume 4: Eighteenth-Century Science* (Cambridge: Cambridge University Press, 2003), pp. 184–210. For a recent exception, see Erika Lorraine Milam and Robert A. Nye eds., "Scientific Masculinities", *Osiris* 30, pp. 1–368.
23. Even Jan Golinski does not challenge the overall professionalization thesis, referring to the coining of the term 'scientist' by William Whewell at the 1833 BAAS meeting at Cambridge as

'a significant step toward the formation of a modern professional persona'. See Golinski, 'Humphry Davy's Sexual Chemistry', p. 16.

24. Charles W. J. Withers and Rebekah Higgitt, 'Science and Sociability: Women as Audience at the British Association for the Advancement of Science, 1831–1901', *Isis* 99:1 (2008), pp. 1–27.
25. Ibid., p. 14.
26. Naomi Zack, *Bachelors of Science: Seventeenth-Century Identity, Then and Now* (Philadelphia, PA: Temple University Press, 1996).
27. See, for example, Ruth Barton, '"Men of Science": Language, Identity and Professionalization in the Mid-Victorian Scientific Community', *History of Science* 41 (2003), pp. 73–119.
28. See for example, Jill Howard, '"Physics and Fashion": John Tyndall and his Audiences in Mid-Victorian Britain', *Studies in History and Philosophy of Science* 35 (2004), pp. 729–758.
29. See, for example, Jan Golinski, 'Humphry Davy: The Experimental Self', *Eighteenth Century Studies* 45:1 (Fall 2011), pp. 15–28.
30. Hannah Gay and John W. Gay, 'Brothers in Science: Science and Fraternal Culture in Nineteenth-Century Britain', *History of Science* 35:4 (1997), p. 426.
31. Ibid., p. 427.
32. Ruth Barton, '"Men of Science"', p. 81.
33. Ibid., p. 75.
34. James A. Secord, *Visions of Science: Books and Readers at the Dawn of the Victorian Age* (Chicago, IL: University of Chicago Press, 2014), p. xcv.
35. See, in particular, Golinski, 'Humphry Davy's Sexual Chemistry', pp. 15–41; Golinski, 'Humphry Davy: The Experimental Self', pp. 15–28.
36. See Jan Golinski, *Making Natural Knowledge: Constructivism and the History of Science, with a New Preface* (Chicago, IL: Chicago University Press, 2008).
37. Ibid., p. xiii.
38. Ibid., p. 66.
39. Ibid., p. xiii.
40. Christopher Lawrence and Steven Shapin, eds., *Science Incarnate: Historical Embodiments of Natural Knowledge* (Chicago, IL: University of Chicago Press, 1998).

41. Jan Golinski, 'The Care of the Self and the Masculine Birth of Science', p. 128.
42. Ibid., pp. 125–145.
43. See, for example, Keller, *Reflections on Gender and Science*; Scott, *Gender and the Politics of History*.
44. Golinski, 'The Care of the Self', pp. 126–127.
45. Golinski, 'Humphry Davy: The Experimental Self', p. 24. Davy's contradictory reception as both a positive masculine role model and the embodiment of an effeminate fop are discussed in more detail in Chapters 3 and 4 in this volume.
46. Golinski, 'Humphry Davy's Sexual Chemistry', p. 19.
47. Paul White, *Thomas Huxley: Making of the 'Man of Science'* (Cambridge: Cambridge University Press, 2003).
48. Adams, *Dandies and Desert Saints*, p. 1.
49. White, *Thomas Huxley*, pp. 22; 20.
50. Ibid., p. 20.
51. Golinski, 'Humphry Davy's Sexual Chemistry', p. 18.
52. Ruth Barton, '"Men of Science"', p. 90.
53. See, for example, A. D. Orange, 'The Beginnings of the British Association, 1831–1851', in McLeod and Collins, eds., *Parliament of Science*, p. 59.
54. On the gentleman as a gendered ideal, see, for example, Jason D. Solinger, *Becoming the Gentleman: British Literature and the Invention of Modern Masculinity* (New York: Palgrave Macmillan, 2012); Gillian Williamson, *British Masculinity in the 'Gentleman's Magazine', 1731–1815* (Basingstoke: Palgrave Macmillan, 2016); there is much more work needed on the scholar as a gendered figure and on scholarly self-fashioning as a process of masculine identity formation. Recent studies of scholarly identity in the past neglect gender almost entirely. See, for example, Pedro Javier Pardo, 'Satire on Learning and the Type of the Pedant in Eighteenth-Century Literature', *BELLS* (Barcelona English Language and Literature Studies) 13 (2004), http://www.publicacions.ub.edu/revistes/bells13/PDF/articles_10.pdf; Richard Kirwan, ed., *Scholarly Self-Fashioning and Community in the Early Modern University* (London: Routledge, 2013). The study of student masculinities is much more common. For studies which examine both student and scholarly masculinities, see, for example, Ruth Mazo Karras, 'Sharing Wine, Women and Song: Masculine

Identity Formation in the Medieval European Universities', in Jeffrey Jerome Cohen and Bonnie Wheeler, eds., *Becoming Male in the Middle Ages* (New York: Garland, 1997), pp. 187–202; Alexandra Shepard, 'Student Masculinity in Early Modern Cambridge, 1560–1640', in B. Krug-Richter and R. E. Mohrmann, eds., *Frühneuzeitliche Universitätskulturen: Kulturhistorische Perspektiven auf die Hochschulen in Europa* (Cologne: Böhlau, 2009), pp. 53–74; Heather Ellis, 'Foppish Masculinity, Generational Identity and the University Authorities in Eighteenth-Century Oxbridge', *Cultural and Social History* 11:3 (2014), 367–384.

55. On this, see, for example, Barton, '"Men of Science"'; Heather Ellis, 'Knowledge, Character and Professionalization in Nineteenth-Century British Science', *History of Education* 43:6 (2014), pp. 777–792. On the "Decline of Science" debate, see Secord, *Visions of Science*, pp. 52–79.
56. Steven Shapin, 'A Scholar and a Gentleman': 'The Problematic Identity of the Scientific Practitioner in Early Modern England', *History of Science* 29:3 (1991), pp. 279–327.
57. See, in particular, A. D. Orange, 'The Idols of the Theatre: The British Association and its Early Critics', *Annals of Science* 32:3 (1975), pp. 277–294.

CHAPTER 2

The Changing Public Image of the 'Man of Science', 1600–1830

Feminist Histories of Early Modern Science

For a contemporary readership, 'the abstract noun *science* evokes not only grandeur and power but also a particular type of mastery of the world', writes Ludmilla Jordanova.[1] This 'particular type of mastery', she argues, is profoundly masculine and should be seen as the peculiar legacy of the Scientific Revolution and Enlightenment. Jordanova, together with other feminist and women's historians, has maintained that the advent of the 'new science' developed by Francis Bacon and others in the early seventeenth century initiated a process whereby women were systematically excluded from the study and practice of science, and their inferior position in society, more broadly, was legitimated through scientific theory. This inferiority was then further entrenched by the sexist ideology of natural rights and rationalism of the Enlightenment, which Dena Goodman has described as giving birth to 'a mythical history of masculine reason'.[2] Since the early 1980s, there has been much brilliant work by feminist and women's historians seeking to recapture the forgotten role of women in science and to expose the construction of artificial narratives of female inferiority.[3] Although the *men* of science themselves have not been the prime focus, these accounts also construct a narrative about male scientists, their power and their self-fashioning.[4] While we have learned much about the structural and discursive ways in which women have been excluded from Western science and, by extension, about the ways in which male power has been constructed through the

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
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discourse of science, there have been few attempts to question the security of this male power.

In accounts written by historians investigating both the exclusion of women from science and the role of scientific knowledge in the oppression of women, more broadly, the authority of male scientists is often taken for granted. Recapturing the stories of individual women scientists while leaving the superstructure of masculine scientific authority in tact only underscores further the power differential between the sexes.[5] When politically conscious feminist historical accounts of the Scientific Revolution and Enlightenment began to appear in the 1980s, their determination to expose the systematic oppression of women within science created an equally powerful accompanying narrative of male power. They argued for the existence of a 'gendered mental pathology' underlying the new science, especially in the works of Francis Bacon which successfully buttressed male power and exclusivity with a 'doctrine of female inferiority' inscribed into science itself.[6] As Carolyn Merchant has written, '[f]emale imagery became a tool in adapting scientific knowledge and method to a new form of human power over nature'.[7]

According to Merchant, the story of the new science, as told by its male protagonists, was one of relentless progress, involving the increasing exclusion of women, propelled by processes of professionalization, institutionalization and specialization. This explanation drew heavily on sociological accounts of the development of modern science and seemed to offer a convenient means of accounting for the gendered divide in scientific circles. 'With gender as an analytic tool', Ann Shteir writes in her study of the history of botany, 'one can interpret the … emergence of professionalized discourses in terms of a masculine "culture of experts" taking away authority that earlier had been invested in women's feelings and experiences.' Thus, the '[p]rofessionalization of botany meant its masculinization as well'.[8] The professionalization narrative is arguably the most familiar gendered account of the development of modern science. By accepting this narrative, however, historians risk repeating and reinforcing the very narratives of male dominance and female subordination they are seeking to challenge.

The most obvious method for those wanting to undercut this hegemonic narrative of male power is the one chosen by feminist historians: to highlight the ways in which women have been systematically excluded from the world of science and to draw attention to those rare individuals who defy the odds. This approach, however, tends to create the

impression that gender, as a category of analysis, is only really helpful for understanding contexts in which women are directly involved. Thus, a number of historical studies of women in science suggest that gender as a category was only relevant for male scientists when they were defining themselves against women. For Ludmilla Jordanova, then, gender as a facet of identity frequently appears 'silent' and even unimportant when applied to men of science. 'I would suggest', she writes, referring to male scientific practitioners in early modern Britain, 'that the manner in which their identities were constructed simply took for granted that (a certain kind of) masculinity would be central to it. But this was a silent assumption on the whole because there was no special need to articulate it in confrontational terms.'[9] This last sentence is important and worth reflecting on. It suggests that the language of gender only became relevant to the self-fashioning of male scientists when they were explicitly 'confronted' or threatened by women. As women in Britain were almost totally excluded from formal participation in science by the end of the early modern period, such direct confrontation was unlikely. Indeed, Jordanova goes so far as to state that '[i]t might be thought pointless even to raise questions about gender and science' in late eighteenth- and early nineteenth-century Britain, 'given the general situation of women then'.[10]

This view is heavily informed by the work of anthropologist and cultural theorist, Mary Douglas, in particular, her classic 1966 study, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo.* Here, Douglas argued that if women were formally excluded from political, legal and economic structures, then men would not feel 'threatened' by them and would feel 'less need for periodic assertion of [their] power', in part through the overt use of gendered language.[11] Douglas's argument has often been adapted by scholars studying the place of women in the history of science. Lesley Dean-Jones, for example, in her 1994 study, *Women's Bodies in Classical Greek Science*, argued that '[w]omen operated under such controls that they had no opportunity to threaten the male sphere; the demarcation of the roles of men and women was not "precarious", so no rituals had to be elaborated to force the poles apart.'[12] It is precisely this kind of argument which helps to explain the absence of studies on the masculine self-fashioning of men of science in Britain since the Scientific Revolution. According to the logic of historians like Dean-Jones, men only invoke gender as a cultural marker where they feel a direct existential threat from women.

For many feminist and women's historians, then, gender, both as a facet of identity and category of analysis, is relevant only when studying relations between men and women. Jordanova's work exemplifies this well. As women were increasingly excluded from the formal structures and institutions of science, male scientists rarely encountered women in the course of their scientific work. Thus to study the activities of men of science is not to investigate relations between men and women (where gender would be a relevant distinction), but rather between men. This is why, for Jordanova, at least, gender is largely 'silent' and the only place she finds it operating is among so-called men-midwives or *accoucheurs*, where men of science still found 'opportunities for defining themselves in comparison to women'.[13] Following the argument of Mary Douglas, once again, these were also the only male scientific practitioners who might have felt their masculine status challenged and, as such, have been vulnerable to charges of effeminacy.[14]

History of Masculinity Approaches

If, however, we take stock of work which has been carried out in the relatively new field of the history of masculinity, we encounter different ideas about how gender operates among men. Firstly, and most importantly, historians of masculinity have shown that overtly gendered language has been used by men, in the past, just as much to distinguish among themselves as to define boundaries with women. As John Tosh has written of the language of manliness in nineteenth-century Britain: it was 'only secondarily about men's relations with women'. 'The dominant code of Victorian manliness', he declared, 'with its emphasis on self-control, hard-work and independence, was that of the professional and business classes, and manly behaviour was what (among other things) established a man's class credentials vis-à-vis his peers and his subordinates.'[15] Most obviously, gendered language used to draw distinctions among men has taken the form of discourses of effeminacy. Effeminacy, though, still relies primarily on the male–female binary. In the above quotation, Tosh makes the important point that masculinities (or the gendered identities of men) do not exist in isolation from other key facets of identity—including class, race, religion and age. Terms which have been viewed as central to understanding concepts of masculinity, such as 'manliness', are shown to combine a gendered signification with a host of other connotations reflecting the influence of other cultural markers. In particular, Tosh has highlighted the centrality of distinctions of age and maturity in defining manliness

in nineteenth-century Britain.[16] Likewise, Stefan Collini has noted that Victorian understandings of manliness have been shaped by contrast 'less with the "feminine" and more with the "bestial", non-human, childlike and immature'.[17]

The tendency to overestimate the importance of the male–female binary and the notion of a single masculinity which is 'simply "not femininity"' has been criticized by Donald E. Hall.[18] John Pettegrew has likewise highlighted the limitations of what Robert S. McElvaine has termed the '"notawoman" definition of manhood'.[19] According to Susan Stanford Friedman, the tendency to focus exclusively on 'the otherness of women' denies 'the structural process of "othering" by a host of other factors such as race, ethnicity, class, sexuality, religion, national origin and age'. Whichever one is concentrated on, no single cultural marker should ever be treated 'as the primary category of oppression to which all other systems of alterity must be subsumed'. When this occurs, the result is a damaging and dangerous sort of 'categorical hegemony'.[20] As Stefan Dudink advises, we should stop viewing masculinity as a separate category and think of it rather as being embedded within a number of other interwoven cultural discourses. 'In masculinity and its history', he writes, 'other social, political and cultural histories—with their own temporalities—merge, making for an uneven development of a seemingly coherent masculinity'.[21]

Some feminist readings of the history of science have distinguished too sharply between discourses of identity which actually informed and overlapped each other in the past. Taking the ideal of the 'scientific gentleman', for example, Ludmilla Jordanova has defined this as 'a term pertaining to social status', eliding thereby the ways in which 'gentleman' could also indicate an ideal of masculinity, albeit one shot through with notions of class.[22] If we turn to examine discussions of the early modern male scientist in the mainstream history of science literature, we frequently encounter similar assumptions. Insofar as gender is dealt with at all, it is only when women are felt to threaten male power and authority directly. We see this, for example, in the treatment of gender in Volume 4 of the *Cambridge History of Science* which covers the eighteenth century. Discussion of gender is confined to a specific chapter on 'Women and Gender in Science' by the feminist historian, Londa Schiebinger.[23] Likewise in Volume 3 of the same series which covers the early modern period. At the beginning of the chapter, where a discussion of masculinity would surely have been appropriate—Steven Shapin's chapter on 'The Man of Science'—the reader is told that 'it would distort such a brief survey to devote major attention

to the issue of gender' as 'the system of exclusions … kept out all but a very few women'.[24] What is more, the reader is directed in a note to Schiebinger's chapter on women in the same volume should they wish to read more about gender and science.[25]

Even historians who have focused their attention on *men* of science, such as Paul White in his 2003 biographical study of T.H. Huxley, tend to refer to the question of masculinity only in contexts where male scientists felt directly challenged by women. In White's book, which promises to focus explicitly on the 'making' of the man of science, analysis of Huxley's gender identity is confined to the chapter discussing his domestic relations, in particular, the power dynamics between himself and his future wife Henrietta Heathorn. The claim that 'Huxley's "man of science" was fundamentally, a gender identity', is explained purely with reference to the fact that its formation 'entailed particular constructions of the home and women'.[26] When fashioning his identity in opposition to other men of science, White assumes that distinctions other than gender mattered most to Huxley—above all, class.

Following historians of masculinity, this book argues, by contrast, that distinctions of gender were just as important in constructing the identities of men of science among themselves. The notion that men have employed the language and imagery of gender to draw distinctions and define power relations with other men has long been accepted within the history of masculinity.[27] A rare figure in the history of science who has engaged closely with gender history is Jan Golinski, whose research has been discussed in Chapter 1.[28] In the context of his work on the self-fashioning of one particular man of science from the early nineteenth century, Humphry Davy, Golinski admitted that 'social behaviour that largely excludes women has … been closely linked with the discursive construction of a strongly gendered sense of identity among the scientists themselves.'[29] Elsewhere, he has written that '[i]t seems clear that gendered discourse and behaviour entered into the self-fashioning of male practitioners of the sciences in a quite intimate way' and has called upon historians of science to pay greater attention to work carried out in the field of gender studies.[30] In the rest of this chapter, then, I will be focusing not on women or their exclusion from the world of science *per se*, but rather on male scientific practitioners and their processes of self-fashioning.

It is important to acknowledge that the decision to focus upon processes of identity formation in men has been criticized by some feminist

and women's historians for refocusing scholarly attention back onto men who, they argue, have dominated the historical narrative for long enough.[31] Most historians of masculinity, however, write with a similar desire to challenge hegemonic narratives of male power. By focusing on men and the ways in which they construct their identities, they argue, we learn more about the weaknesses and insecurities undercutting their superficially stable masculine authority.

In this sense, the aim of this book is not very different from historians studying the role of women in science like Ruth Watts. In the introduction to her 2007 study, *Women in Science: A Social and Cultural History*, Watts wrote, paraphrasing Foucault, that it was her goal to uncover all the 'local, discontinuous, disqualified, illegitimate knowledges' associated with women which mainstream history had forgotten. She portrayed this aim as offering a valid alternative to 'accepting one linear narrative of the powerful'.[32] To focus our analysis explicitly on processes of identity construction by male scientists, to consider the deliberate choices they made about how to represent themselves in public and private, and the reasons behind these choices, is to reveal the constructed, fragmented and, ultimately, artificial nature of male scientific authority. As such, it may function as an equally, if not even more, effective alternative to 'accepting one linear narrative of the powerful'. To study the self-fashioning of men of science is to scrutinize that very narrative, to deconstruct, question and expose it. As Naomi Zack hinted in her study of men of science in seventeenth-century England: 'These bachelors of science were inventing themselves as much as they were creating contexts for redefining women.'[33] While not exploring this aspect herself, she called for more historical research on male scientists which takes into account 'the intellectual history and intellectual biography of the philosophers in question', including their gendered self-construction.[34]

Helpfully, Zack criticizes some of the more extreme feminist readings of seventeenth-century science, in particular the claim that there was an unrelenting 'virilization' of science in this period. Indeed, she admits that nothing more than a 'rhetorical masculinization of reason' took place.[35] This distinction is important as it reminds us of the boundary between the realms of rhetoric and self-promotion on the one hand, and actual practice and self-perception on the other, which were quite different. Masculine authority is shown to be as deliberately constructed and artificial as feminist historians have revealed narratives of female inferiority to be.

Between the Scholar and the Gentleman

To investigate the weaknesses and insecurities of men of science in early modern Britain, we must move beyond accounts of women's roles and activities in science. Significantly, when we look at the mainstream history of science, although there are few theoretically informed analyses of gender identity,[36] there are nonetheless significant arguments which historians of masculinity should pay attention to. Of particular interest here are many recent accounts of scientific development from the seventeenth to the early nineteenth century which contradict still popular sociological narratives of professionalization. Jim Endersby, Ruth Barton and others argue persuasively that science, in Britain at least, remained a largely amateur affair until late in the nineteenth century, with modern professional associations and salaried positions in short supply.[37]

At the heart of this challenge to the professionalization thesis, which has proven so popular with feminist and women's historians, has been work carried out on the British Association for the Advancement of Science. Roy McLeod, Peter Collins, Jack Morrell and Arnold Thackray have shown convincingly in their institutional histories of the BAAS that professionalization was not a widely held aim of its founders in 1831; the term 'professional', they argue, was rarely used, and when it was, tended to mean something quite different from how we use it today. It was precisely this feeling of discomfort with the narrative of professionalization which led Ruth Barton to prefer the contemporary term 'man of science' over the modern equivalent 'scientist' which seems to presuppose a modern scientific profession. As she has convincingly argued, the term 'man of science', which continued to dominate into the early twentieth century, emphasized instead personal qualities, morality and character. This distinction is a significant gain in the historical analysis of men in science.

Recognizing that professionalization narratives do not hold the explanatory force many historians have argued for is an important step towards developing a more critical attitude towards male scientific power in the past. It removes one of the key structural supports for the argument advanced by feminist historians that the masculine authority of male scientists was growing and becoming increasingly embedded within the formal structures of science during the early modern period. Alone, however, it is not enough. We need to focus explicitly on the self-fashioning of men of science, the ways in which they sought to represent themselves and their claims to authority. Key here is the work of Steven Shapin, a traditional

historian of science with little interest in gender *per se*.[38] Rejecting the professionalization narrative and concentrating instead on what Jim Endersby has termed 'actors' categories', Shapin concentrates his analysis on the two ideals with which male scientists were most often associated in the seventeenth century and with which they chose to associate themselves—the gentleman and the scholar.[39] By focusing on the terms used by men of science themselves, Shapin reveals a much more nuanced story of anxiety, weakness and failure to convince.

He presents the new science, as it emerged in the seventeenth century, differently from many received accounts—as desperately (and unsuccessfully) seeking legitimation from traditional sources of cultural authority, above all, the figure of the gentleman. He highlights how the traditional male role with which the purveyor of the new knowledge would naturally be associated—the scholar—was frequently depicted as a weak, isolated and passive character, distinctly lacking in cultural authority.[40] Despite concerted attempts by early Fellows of the Royal Society, founded in 1660, and advocates of Baconian induction to unite the roles of scholar and gentleman in the figure of the male practitioner of the new science, the two roles remained poles apart. Indeed, Shapin goes so far as to claim that 'the portrayal of the scholar and philosopher as solitary melancholics was an institution in social commentary, medicine, poetry and painting' throughout the early modern period.[41] While Shapin never imbues this trend with an explicitly gendered dimension, if we look at depictions of the scholar in a range of sources from the time, they reveal much about the gendered implications of the scholarly life. Shapin himself sums up the portrayal of the typical scholar as follows: 'He was lacking in the knightly virtue of valour; his blind reliance upon ancient authority over prudence was an expression of timidity … Withdrawn study worked against the acquisition of that sense of emulation and responsibility that made men do brave deeds.'[42] Moreover, he repeatedly cites commentary on the figure of the scholar which is explicitly gendered. He mentions Montaigne, for example, who declared that 'the pursuit of learning makes men's hearts soft and effeminate more than it makes them strong and warlike'.[43]

Bacon, too, in his advocacy of the new science, recognized the pervasiveness of the effeminate stereotype of the scholar. In an attempt to prevent the aligning of the new inductive science with traditional gendered views of the scholar, he assured his readers that induction did not 'soften men's minds' or make them 'more unapt for the honour and exercise of arms'.[44] Indeed, he insisted that the new science should be explicitly

'masculine'. As Rob Iliffe has shown, Bacon described the development of inductive science as a 'masculine birth of time', the vigorous male offspring of a dynamic 'sexual' encounter between the masculine method of induction and female nature.[45] Extending the metaphor of sexual reproduction, scholastic knowledge of the natural world, built on the text-based philosophy of classical Greece and Rome, was dismissed by Bacon as having 'what is proper to boys'. 'It is a great chatter-box', he wrote, 'and is too immature to breed.'[46] Moreover, Iliffe argues, Bacon constructed a vision of inductive science as a difficult process of masculine self-fashioning for the individual male scientist. It was an 'activist enterprise', involving a 'radical transformation' and 'rigorous disciplining of the self'.[47] Bacon envisaged that the sustained and creative use of induction would lead to a revolution in natural philosophy and the creation of a 'blessed race of Heroes or Supermen who will overcome the immeasurable helplessness and poverty of the human race'.[48]

In the decades after Bacon's death, when the Royal Society was defending itself against charges of disrespecting the ancients, the language of gender was used by its supporters to distinguish the 'new' philosophy from the effeminacies of the ancient world. The classical scholar and theologian, William Wotton, who defended Bacon's inductive philosophy, praised Descartes for marrying together physics and mathematics, declaring he had 'put the World in Hopes of a Masculine Off-spring in process of Time'. Moreover, he referred to there being 'such swarms of Great Men in every part of Natural and Mathematical Knowledge' which 'have within these few years appeared'.[49] As Shapin's work shows, however, despite Bacon's attempt to 'respecify' the traditional image of the scholar by linking the practitioners of the new science with the figure of the gentleman, in general discussion, the two ideals remained very much distinct. Purveyors of the new knowledge, as we have seen, remained strongly aligned with traditional images of the isolated and effeminate pedant-scholar.

If, however, we apply an overtly gendered lens to Shapin's analysis, we see that in his discussion of a particular early modern figure—the virtuoso—the identities of gentleman and scholar do indeed combine, albeit in their negatively gendered extremes. The virtuoso was a figure particularly associated with the socially elite men of science who became Fellows of the Royal Society.[50] Being 'wholly conversant among insects, reptiles, animalcules, and those trifling rarities that furnish out the apartment of a virtuoso', as the *Tatler* put it in August 1710, tends to make such men

'utter strangers to the common occurrences of life'.[51] Unworldliness, the main characteristic of the traditional pedant-scholar, was not the only distinguishing trait of the virtuoso. At the same time, he displayed many features of the aristocratic fop: overweening pride and vanity, affectation, presumption and ostentation are just some of the words used to describe the virtuoso in this period.

In Samuel Butler's satires, from the early 1660s, we see one of the earliest critiques of the new science, its practitioners and the Royal Society. In one satire on *Pedants*, Butler reveals how the figure of the virtuoso has begun to blur the lines between the traditionally distinct characters of the pedant and the fop. He pictures the practitioner of the new science as a foppish 'virtuoso', entranced by the 'Imported Affectations' and 'Fashions' of France, who does not deal in 'Knowledge' but in 'Pedantry'. Taking direct aim at the much-feted hero of the new science, Robert Boyle and his famous air pump, Butler describes the scientific virtuoso as follows:

> Puft up with his own conceit, and Swels
> With Pride and vanity and Nothing else,
> Like Bladders in the Late Pneumatique Engine,
> Blown up with nothing but their owne Extension.[52]

No figure in contemporary satire, however, more effectively captured the essence of the scientific virtuoso than the famous Sir Formal Trifle. He is the foppish pedant in the satirical play, *The Virtuoso*, by Thomas Shadwell, first performed in 1676 and which deliberately targeted the newly formed Royal Society. The gendered overtones of the figure of the virtuoso were clear from Shadwell's own Dedicatory Epistle where he commented that his play would only be disliked by 'women and some men of feminine understandings' who might see too much of themselves in the characters featured.[53] As a contemporary critic, Gerard Langbaine, noted, Shadwell was one of the first commentators to attempt to lay bare the weaknesses of the practitioners of the new science—to chink the armour of scientific authority: 'No Man ever undertook to discover the Frailties of such Pretenders to this kind of Knowledge, before Mr. Shadwell.'[54]

Although Shapin ends his analysis in the late eighteenth century, and claims not to know what happened to the gentleman and scholar after this point, we can take his argument forwards into the nineteenth century. As I will show in the rest of this chapter, when the man of science was discussed, the two figures remained poles apart in public discourse. In the

early part of the nineteenth century, the man of science remained closely linked to the isolated and effeminate image of the scholar. In the wake of the Industrial Revolution, with growing social problems linked to population shifts and pressure for political reform, ideals of masculinity became increasingly connected with practical skill and the ability to have a measurable impact on the world.[55] Against this background, traditional masculine roles involving isolation, such as the priest and the scholar, which had long been the subject of gendered criticism, came in for yet stricter censure. As Timothy Alborn has shown, some of those campaigning for scientific reform in the 1820s reacted to this shift, increasingly locating scientific 'genius' in the collective rather than the individual and couching their plans for organizational reform in the language of political economy.[56]

In the 1820s and 1830s, men of science were often still likened to, and criticized in the same manner as, traditional scholars and men of letters. Typical here was the inclusion of 'men of science' in a series entitled 'Fraser's Gallery of Illustrious Literary Characters' which published eighty-one portraits, some critical and satirical, others laudatory, in the course of eight years between 1830 and 1838.[57] Richard Hengist Horne's 1833 *Exposition of the False Medium and Barriers: Excluding Men of Genius from the Public* likewise classed 'Men of Science, and Original projectors and Inventors' as a subgroup of 'men of genius' alongside 'Epic Poets and Philosophers; Dramatic Authors, Composers etc.'[58] Men of science, Horne argued, were, on the whole, utterly neglected and rejected, ending their days in the same poverty they had lived in throughout their lives. 'How many an unfortunate mechanist or chemist has passed a life of voluntary seclusion and incessant labour … amidst the pressure of immediate distress', he observed.[59] There follows one of the most depressing portrayals of the life of a typical man of science written in this period. To appreciate the extent to which Horne's depiction here mirrors the traditional view of the isolated scholar it is worth quoting in full:

> By him [the scientist] the progress of time, with all its contingencies has been little noted; the light of day, perhaps, exchanged for the noxious vapour and the sullen lamp, and scarce distinguished from the night. Amidst this one unbroken, changeless round, with eye for ever bent upon its sole object, he pauses at time perchance to think of his human state—looks at the close, dismal walls, and low oppressive ceiling, that entomb his lone form—obscure, neglected, squalid, and without a friend—gazes with fixed eye, while his chin drops upon his raised hand, at the only companion of

> his toil—that wasting lamp—and thinks of his own existence—of his boyhood, his past years—his wrecked hopes, affections, passions … of present want—of suicide—and futurity! (We will not suppose him to have a wife and children. It is impossible …) With a deep, desponding sigh, he returns to his toil, and this continues till sickness or premature decay has brought him to the threshold of the grave.[60]

Horne refers to 'the almost inevitable fate of those who depend for support upon the production of works addressed solely to the very limited number of the profound in science, and the erudite in learning'. Such individuals represented the epitome of effeminate dependence. 'When such men, so circumstanced, are *not* starved', Horne remarks, 'then, to invert Ockley's fine orientalism, the stars *must* have altered their courses!' Indeed, he identifies one of the greatest difficulties faced by the typical man of science as 'the long rooted prejudices of mankind'.[61]

To gain a sense of how profoundly the image of the scientist as weak and isolated scholar persisted in the period preceding the foundation of the BAAS in 1831, it is instructive to examine the description of one of the few men of science who was publicly recognized during these years. At the anniversary dinner of the Royal Society in 1826, a Royal Medal was awarded to the aged chemist John Dalton. From the description of Dalton given by Humphry Davy in his presidential address, it is clear that the medal was both an attempt to raise Dalton's individual masculine status with the wider public and the reputation of men of science more broadly. In his speech, Davy anticipated many of the features of the image of male scientists which Richard Horne described in his book a few years later. We hear of Dalton's 'long and painful labours' over more than a quarter of a century. 'He has remained', Davy says, closeted away 'in the obscurity of the country, neither asking for approbation nor offering himself as the object of applause.' His scientific endeavours alone have not succeeded in winning a masculine reputation for himself. The medal was, therefore, needed, Davy declares, to 'give a lustre to his character' and 'make his example more exciting to others in their search after useful knowledge and true glory'.[62] The award of the other Royal Medal that year to the mathematician James Ivory was justified in similar terms. Although a well-known mathematician in scientific circles, Ivory's public image remained that of an isolated scholar, whose scientific researches 'have no immediate popularity and which are intelligible only to a few superior minds'.[63]

Royal Society Fops and the 'Decline' Debate

The derisory figure of the virtuoso or foppish pedant, who blurred the otherwise clear lines between the scholar and the gentleman, persisted as a popular stereotype from the performances of Shadwell's play in the last years of the seventeenth century until a century later when Shapin ends his analysis. Although the term 'virtuoso' was not used as frequently after this point, the Fellows of the Royal Society continued to be subject to regular accusations of foppish, vain and effeminate behaviour well into the nineteenth century. Indeed, along with the still popular image of the scholar as isolated pedant we have just examined, overtly gendered accusations of foppery against Fellows of the Royal Society played an important role in the so-called 'Decline of Science' debate in the first decades of the nineteenth century.[64] It was this debate which gave rise to the establishment of the British Association, which, as we will see in Chapter 3, attempted to remake British science in a manly mould, by going back deliberately to the overtly gendered Baconian ideal which had first inspired Robert Boyle and the other early members of the Royal Society.

Although the Decline debate is usually held to begin in 1830 with the publication of Charles Babbage's *Reflections on the Decline of Science*, there had been mounting criticism in journals and newspapers of the state of British science, with most charges focused on the Royal Society, since the later years of the eighteenth century. As early as 1772, the long-standing president, Joseph Banks, was satirized by the caricaturist, Matthew Darly, as an extravagantly clad fop. Labelled as either 'the botanical Macaroni' or 'the fly-catching Macaroni', his only purpose in travelling the world, supposedly in the advancement of science, was to catch a fly. Here, we see the figure of the virtuoso being reinterpreted through an alternative gendered term of abuse, the macaroni.[65] In the opening years of the nineteenth century, Henry Brougham, journalist and Fellow of the Royal Society (FRS), railed in the periodical press against what he saw as the effeminate environment of metropolitan science which included not only older institutions like the Royal Society, but also more recent foundations which offered public lectures aimed at a broader cross-section of society like the Royal Institution. 'We have of late observed in the physical world', Brougham wrote in an 1803 article for the *Edinburgh Review*, 'a most unaccountable predilection for vague hypothesis daily gaining ground.'[66] Even from the Royal Society, the masculine reasoning characteristic of England's greatest scientific heroes, Newton and Bacon, had been

'put to flight', replaced by 'wild phantoms of the imagination'. 'We wish to recal [*sic*] philosophers to the strict and secure methods of investigation pointed out by the transcendent talents of those illustrious men and consecrated by their astonishing success', Brougham declared. He opposed the overtly masculine categories of 'discovery', 'successful induction' and 'facts' to unmanly 'hypothesis … a work of fancy, useless in science, and fit only for the amusement of a vacant hour'.[67]

The specific object of Brougham's attack was Thomas Young, a long-standing Fellow of the Royal Society and the individual whose work he was ostensibly reviewing for the *Edinburgh Review*. 'It is difficult to argue', he wrote, 'with an author whose mind is filled with a medium of so fickle and vibratory a nature.' And here is the overtly gendered rub:

> We demand [ask], if the world of science, which Newton once illuminated, is to be changeable in its modes, as the world of taste, which is directed by the nod of a silly woman, or a pampered fop? Has the Royal Society degraded its publications into bulletins of new and fashionable theories for the ladies who attend the Royal Institution?[68]

In Brougham's construction, the decline of science in Britain, evident in the replacement of inductive method with vague hypothesis, is figured as a process of feminization or emasculation, with 'pampered fops' and 'silly women' directing the world of science once led by the great Newton. Attacking Young once more using overtly gendered language, Brougham declared:

> An hypothesis is not the discovery of a truth … will not gain victories over prejudice and error, nor extend the empire of Science … It demonstrates neither practice of investigation, nor rich resources of skill, nor vigorous habits of attention, nor powers of abstracting and comparing, nor extensive acquaintance with nature. It is the unmanly and unfruitful pleasure of a boyish and prurient imagination, or the gratifications of a corrupted and depraved appetite.[69]

In this harsh critique, Brougham drew on the multiple connotations of the language of manliness. While attacking the type of science he believed Young's work to represent as womanish and effeminate, he also drew on the alternative use of 'manly', to designate something or someone as being mature and fully developed. He described science as a weak and sickly boy who would not reach manhood if hypothesis continued to dominate over

the proper use of induction. Scientific work must not, he wrote, be 'of the puny, sickly nature of Dr. Young's productions, which have scarcely *stamina* to subsist'.[70] Here, Brougham's use of metaphors connected with both gender and maturity remind us of Bacon's similar critique of scholastic approaches to knowledge in the seventeenth century before the foundation of the Royal Society.[71]

As criticism mounted in the early years of the nineteenth century, the personal character of Royal Society Fellows as men was openly called into question. A number of scandals hit the Society in the years between 1800 and 1830 which were aired in rather unseemly fashion in the newspapers. Many of the accusations levelled by those who felt excluded, ignored or otherwise wronged by the Society, were couched in explicitly gendered terms and accused Fellows of secrecy, cowardice and foppish disdain for the truth. Take the case of John Herapath, for example, a mathematical physicist and early advocate of the kinetic theory of gases. He was accused of plagiarism and pretence by colleagues at the Royal Society. When they refused to accept the results of his experiments in 1820, Herapath launched a vitriolic and long-running campaign against them in the newspapers. In a letter written in 1827, he described his opponents as effeminate cowards, lacking in 'penetration', 'candour' and 'honesty'.[72] Instead of meeting his challenge manfully, they 'tremblingly shrunk from a public contest'. Herapath once more went back to Newton for an example of proper masculine behaviour, recalling the time when he was president of the Royal Society and Leibnitz claimed to have invented the calculus independently of Newton. Rather than ignoring or insulting Leibnitz, Newton and the Royal Society acknowledged his claim and established a committee to investigate the matter. 'Instead of imitating Newton's manly manner', Herapath wrote of the Fellows of his own day, 'they have crept behind every excuse their imagination could create.' Herapath, by contrast, describes himself as the brave hero of the story, 'one man singly combating against a society of near 700 individuals'.[73]

Yet, many attacks came from within the ranks of Royal Society Fellows themselves. Three years later in 1830, a Fellow identifying himself by the pseudonym 'Socius' ('Fellow' in Latin), launched a similarly worded attack relating to the Society's decision to appoint a purely aristocratic president, the Duke of Sussex, who, although a well-educated gentleman, had little knowledge of the natural sciences. Another sign of the Society's supposedly foppish character, 'Socius' wrote an impassioned letter to *The Times*, begging other Fellows to be 'manly' and follow the dictates of their

scientific consciences rather than aristocratic fashion.[74] Another text by an FRS which laid charges of foppery at the door of the Royal Society was the vitriolic pamphlet, *Science Without a Head*, written by the British-Italian physician, Augustus Bozzi Granville, and published in 1830. Particularly offensive to Granville was the Society's expenditure of thousands of pounds of public money in order to 're-gild frames, varnish portraits, furbish up old furniture, brush up the mace, recover velvet-cushions, [and] provide a three-cornered hat for the president'.[75]

Granville was in part building on similar accusations made by the well-known astronomer, FRS, and former member of the Royal Society Council, Sir James South, in another pamphlet published earlier in 1830. The generous annual grant paid by the government to the Royal Society, and intended for the advancement of science, had, South complained, been substantially 'converted into "White Bait, Rose Water, and Sauterne"'.[76] According to South, the Society's activities smacked more of a fashionable gentleman's 'club' than the body of active, labouring men of science, aiming to serve public utility that its founders had hoped it would be.[77] He accused them of frittering away their significant £2,000 p.a. income in 'mace gilding, picture cleaning, and other frivolities; whilst they purchase not a single book to add to their imperfect library'.[78] Granville painted a similar picture. Most Fellows he condemned as 'mere lookers-on—indifferent spectators', quite different from the 'real working men' of science he longed to see.[79] Even the formidable Sir Humphry Davy who was hailed by many contemporaries as a hero of modern science and who provided an important model for the BAAS, was lampooned as an effeminate fop.[80]

In the construction of the pedant-fop or virtuoso, it is important to recognize the obvious overlap between the categories of gender and class which takes place. As we have seen, the men of science most likely to be caricatured as fops were already members of the social elite, often of the actual aristocracy, and Fellows of the exclusive Royal Society. With the impact of the Industrial Revolution and the growth of utilitarianism contributing to a weakening of traditional social hierarchies, historians have argued convincingly that the 1830s should be seen as 'a particularly volatile time for the interrelation between gender and class'. As Judith L. Fisher has written, this 'Reform' decade was 'poised between an aristocratic Regency past and a Victorian middle-class future, rendering gender typing and class markings indeterminate'.[81] Thus, it is interesting to note that despite the tendency of gendered criticism against elite men of science to take the form of accusations of foppery, when distinctions of social

class needed to be drawn (even among the Fellows of the Royal Society), the traditional figure of the isolated scholar was still used to differentiate between elite scientists and royalty.

We see this clearly in the 1830 debate about whether a man of science—the astronomer John Herschel, or a prominent member of the aristocracy—the Duke of Sussex, should be the next president of the Royal Society. Though arguably the most prominent scientist of his day, known to men of science across Europe (as his supporters pointed out),[82] when compared with the brother of the king, Herschel was still likened to the humble figure of the scholar, lacking the necessary masculine 'éclat' to grace the president's chair. Such an important role needed the lustre of aristocracy. As a letter to the *Morning Post* from 16 December 1830 declared, despite Herschel's 'high acquirements', 'other qualifications', which 'mere scholars' did not possess were 'essentially necessary, in order to confer dignity and shed a lustre on the Royal Society, and to render its honours an object of just ambition to men of science in foreign countries as well as our own'. What was needed was a charismatic masculine figurehead, 'some distinguished personage' 'to give éclat to its labours, and due honour to the communications of its members'. Scientific talent and scholarly ability were important considerations, but not decisive in selecting a new president. The Duke of Sussex, we are told, not only enjoyed, 'a mind, naturally possessed of extraordinary talents … adorned … with … a cultivated taste for the highest branches of natural philosophy'; he was 'dignified … also by the highest distinction of Royalty', thus allowing 'the aspirants in every line of art or science' to appeal 'with confidence' to him 'as to an encourager, a protector, and a friend'.[83]

This enthusiasm for royalty in the presidential chair was borne out of a growing conviction that a recent slump in the Society's reputation (viewed as part of a broader decline of science in Britain) was due to the choice of an especially scholarly president, Davies Gilbert, on the resignation of Davy in 1827. The writer of the letter to the *Morning Post* looked back with longing to the distinguished 'reign' of Joseph Banks who, he declared, had been such an effective president precisely because he was not a scholar, but rather a lavish and charismatic patron of science. Although 'not blessed with extraordinary powers of intellect', he wrote, 'or distinguished by the acquisition of superior mathematical knowledge', Banks was

> one of the most useful Presidents that ever directed the *Councils* of the Royal Society, by the splendour which he shed on all its proceedings, by

> the bounty, the liberality, the urbanity, which he manifested not only to all its members, but also to the scientific and literati of foreign countries who visited England.[84]

Banks's style of president clearly represents a very different masculine ideal from that embodied in the isolated scholar; Banks was the urbane and cultured gentleman-patron.[85] As the physician, Sir Alexander Crichton, wrote to Roderick Impey Murchison, one of the founders of the BAAS, in November 1830, 'the presidency of the Royal Society requires a certain state and brilliancy such as Sir J. Banks possessed, to do it justice and maintain its éclat; … there is no possibility of satisfying English men of science with eau sacrée or the pure emanations of mind alone.' 'Mere men of science', he argued, 'not excepting the *all*-powerful and *omniscient* Warburton' or Herschel himself, as 'admirable' as he was 'as far as profound science is concerned', simply did not possess the requisite authority and influence.[86]

As we remember from Chapter 1, Jan Golinski has called for the identity formation processes of male scientists to be studied closely against the background of shifts in contemporary understandings of masculinity.[87] There is no doubt that some contemporaries interpreted the 'decline' of science in Britain as the result of an actual lowering in the quality of men of science available.[88] The Dutch astronomer, Gerrit Moll, writing in 1831 in response to Babbage's book, interpreted the Cambridge mathematician to be claiming that 'there is a lack of scientific men of the first eminence [in Britain] able to be put upon a par with the most renowned foreigners'.[89] Even Sir Humphry Davy, then president of the Royal Society, wrote to William Vernon Harcourt, one of the future founders of the British Association, in 1824: 'Unfortunately Britain now possesses no naturalist who has a reputation that may be called European, and I am afraid we shall long want the genius and arranging spirit of a Cuvier.'[90]

In a bitter letter to *The Lancet* of 3 April 1830, an anonymous Fellow of the Royal Society complained likewise of the decline in the scientific talent of the nation. 'We can no longer boast of Newtons or Davys', he declared, 'the glory of our Society is fast fading away, and must soon cease to be.'[91] Another letter to *The Lancet* from Christmas Day 1830 dismissed the majority of FRSs as untalented, 'mere drones', 'the *herd*'.[92] Like the previous writers, he looked back with sadness to the heroes of the past, even the very recent past, such as William Hyde Wollaston, who had acted as temporary president on the death of Banks in 1820. He praised

Wollaston's 'gigantic mind' and 'unflinching independence' which 'will long be remembered'.[93] The strong implication was that just ten years after Banks's death, such men could no longer be found among Britain's men of science. This state of affairs was easily explained by Babbage and other participants in the Decline debate in terms of the nepotism, corruption and extravagance existing at the heart of the Royal Society. In Babbage's words, the body was run by 'a party, or c*oterie*', quick to suppress any trace of masculine independence and enquiry.[94]

Men of Science and Men of War

However, if we heed Golinski's call and look beyond the fairly narrow world of men of science we see that the scientist also suffered by comparison with other popular masculine role models. On the one hand, as we have seen, the Industrial Revolution and the rise of utilitarianism emphasized practical engagement with the world and its problems as a key characteristic of masculine behaviour. This certainly played a role in the continuing representation of male scientists as isolated and effeminate scholars. On the other hand, however, it is important to acknowledge the impact of the recent Napoleonic Wars. In the years following the end of the conflict, the chief contrast drawn with the man of science in popular discourse was not the gentleman but the soldier—a model of masculinity tied closely to the public demonstration of physical bravery—the polar opposite of the timid and isolated pedant-scholar. Ostensibly reviewing Babbage's book in the *Quarterly Review* in October 1830, the optics specialist and future leading light of the BAAS, David Brewster, complained bitterly of the great many valuable rewards bestowed upon Britain's military heroes while her scientists received nothing.[95]

Looking back to ancient and medieval history, Brewster began his article by arguing for the historical equivalence of martial valour and scientific fame. He declared that 'the appellations of the sage and the hero have at all times been inseparably joined'. In times considerably darker and more ignorant than our own, 'kings conferred the same honours on those who saved their country by their prowess or enlightened it by their wisdom'.[96] He likewise praised Napoleon for having done the same more recently. In France, he wrote, 'The sage and the hero deliberate in the same cabinet … they bear the same titles; they are decorated with the same orders. And the arm and the mind of the nation are thus indissolubly united for its glory or its defence.'[97] The contrast he drew with Britain was stark—in Britain,

scientific strength and valour were not valued at all; a scientific giant like James Watt 'who buckled on the weak arm of man a power of gigantic energy; who taught his species to triumph over the inertia of matter … was neither acknowledged by his sovereign, nor honoured by his ministers, nor embalmed among the heroes and sages of his country'.[98] Not just in France, but also in Germany, Brewster argued, scientists were amply rewarded by the state. At the Gesellschaft Deutscher Naturforscher und Ärzte, founded in 1822 and which functioned as an important model for the BAAS, 'the princes of the blood mingled with the cultivators of science'.[99]

In his article, Brewster argued passionately for a rebalancing of contemporary ideals of masculinity in Britain. 'While the mere possessor of animal courage, one of the most common qualities of the species', he wrote, referring to those who had fought in the Napoleonic Wars, 'has been loaded with every variety of honour, the possessor of the highest endowments of the mind … is allowed to live in poverty and obscurity.'[100] Brewster was equally angry, however, about the lack of response from British men of science, more evidence, in his eyes, of the decline of science in the country and, in particular, of the quality of scientific men. Writing to Babbage on 12 February 1830, while the article was still in press, he declared, 'It is a disgrace to men of science and to the Royal Society, the natural guardian of English science that they have not combined in a vigorous attempt to raise public feeling on the subject.'[101] By contrast, he viewed his own response as an act of manly bravery; his article in the *Quarterly Review*, he stressed in a letter of 10 July 1830 to the physicist James Forbes, was 'not written under the fear of man, and must give offence in many quarters both high and low'.[102]

In assessing the gravity of the situation, Brewster did not pull any punches in his article for the *Quarterly Review*. What he described was the complete unmanning of British science. 'There is not a single philosopher who enjoys a pension, or an allowance, or a sinecure, capable of supporting him and his family in the humblest circumstances!' he declared. 'There is not a single philosopher who enjoys the favour of his sovereign or the friendship of his ministers!'[103] He laid the blame for this firmly at the door of the government, in their capacity as representatives of the nation:

> [T]he sciences … are in a wretched state of depression, and their decline is mainly owing to the ignorance and supineness of the Government … to the indirect persecution of our scientific … men by their exclusion from all the honours of the State; and to the unjust and oppressive tribute which the patent law exacts from inventors.[104]

In other words, the achievements which were publicly recognized as masculine in Britain at this time did not include any activities traditionally associated with men of science. The contrast with France and Germany was stark. On the continent, wrote Babbage,

> [t]he return of the sword to its scabbard seems to have been the signal for one universal effort to recruit exhausted resources, to revive industry and civilisation, and to direct to their proper objects the genius and talent which war had either exhausted in its service or repressed in its desolations. In this rivalry of skill, England alone has hesitated to take a part. Elevated by her warlike triumphs, she seems to have looked with contempt on the less dazzling achievements of her philosophers, and confiding in her past pre-eminence in the arts, to have calculated too securely on their permanence.[105]

Not only, however, did Britain fail to reward her scientists; she was losing them to her European rivals who wisely valued scientific achievements equally with martial valour. 'Bribed by foreign gold, or flattered by foreign courtesy', wrote Brewster, '… the inventions of her philosophers, slighted at home, have been eagerly introduced abroad …The abolition of the Board of Longitude, the only scientific board in the kingdom, at last proclaimed the mortifying intelligence, that England had renounced … her patronage, even of the sciences most intimately connected with her naval greatness.'[106] Thus, for Brewster, it was not only the masculine reputation of men of science which was being slighted and ignored, but the greatness of Britain as a nation, to which, he claimed, science had been contributing an increasingly important part.

The work he was ostensibly reviewing, Babbage's *Reflections on the Decline of Science*, actually went further than Brewster, arguing for the superiority of scientific achievement to military masculinity. Indeed, Babbage went so far as to claim that the tendency of soldiers to rigidly obey their superiors and not to question authority was the very opposite of what an independent, manly and free-thinking man of science should be; he maintained, moreover, that this habit of obedience ought, in some circumstances, to prevent them from practising science or holding positions of authority in the Royal Society. 'There are several peculiarities in military character', he wrote,

> which, though they do not absolutely unfit their possessors for the individual prosecution of science, may in some degree disqualify such persons from holding offices in scientific institutions. The habits both of obedience and

> command, which are essential in military life, are little fitted for the perfect freedom which should reign in the councils of science.

Only an uncommonly powerful scientific mind could overcome the profound limitations which military training and ideals of masculinity brought with them. '[I]t is only in those rare cases where the force of genius is able to surmount these habits, that his admission to the offices of science can be attended with any advantage to it.'[107] At the same time as he exalted the independence of men of science above the more celebrated figures of Britain's military heroes, Babbage worked hard to challenge the still predominant tendency to associate male scientists with the reclusive world of the university. Despite his own position as a Cambridge professor, he was keen to eschew the traditional image of the effeminate scholar and to link the man of science with the practical work of the real world. 'If we look at the fact', he wrote,

> we shall find that the great inventions of the age are not, with us at least, always produced in universities. The doctrines of 'definite proportions', and of the 'chemical agency of electricity'—principles of a higher order, which have immortalized the names of their discoverers—were not produced by the meditations of the cloister.[108]

With the Decline debate in full swing, Britain was poised for a new vision of science and the scientific practitioner. As we will see in Chapter 3, several of the writers who took a prominent role in the Decline debate, in particular, Babbage and Brewster, would be among the originators of a new organization, the British Association for the Advancement of Science. From its foundation in 1831, the BAAS would seek to achieve that which had eluded the Royal Society in the previous century—to reinvent the man of science as a cultivated and fashionable gentleman.

Notes

1. Ludmilla Jordanova, *Defining Features: Scientific and Medical Portraits, 1660–2000* (London: Reaktion Books, 2000). p. 54.
2. Dena Goodman, *The Republic of Letters: A Cultural History of the French Enlightenment* (Ithaca: Cornell University Press, 1994), p. 3.

3. See, for example, Merchant, *The Death of Nature*; Schiebinger, *The Mind Has No Sex*; Jordanova, *Sexual Visions*; Ruth Watts, *Women in Science: A Social and Cultural History* (London: Routledge, 2007).
4. Stephen Greenblatt was one of the first scholars to introduce the concept of self-fashioning to the history of the academic career and of the university scholar. See Stephen Greenblatt, *Renaissance Self-Fashioning: From More to Shakespeare* (Chicago: University of Chicago Press, 1980). Greenblatt's influence has recently been discussed in more detail in Richard Kirwan, 'Scholarly Self-Fashioning and the Cultural History of Universities' in Richard Kirwan ed., *Scholarly Self-Fashioning and Community*, pp. 8–9.
5. See, for example, Londa Schiebinger's comment that Carolyn Merchant, in her 1980 book, *The Death of Nature*, was 'roundly criticised for reinforcing the traditional notion that women belong to nature in ways men do not'. Schiebinger, 'The Philosopher's Beard', p. 193.
6. Golinski, 'Humphry Davy's Sexual Chemistry', p. 18; Golinski, 'The Care of the Self and the Masculine Birth of Science', p. 126.
7. Merchant, *The Death of Nature*, p. 109.
8. Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England, 1760–1860* (London: Johns Hopkins University Press, 1996), p. 157.
9. Ludmilla Jordanova, *Defining Features*, p. 98.
10. Ibid., p. 96.
11. Mary Douglas, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo* (London: Routledge & Kegan Paul, 1966), pp. 140–158, paraphrased by Lesley Dean-Jones, *Women's Bodies in Classical Greek Science* (Oxford: Clarendon Press, 1994), p. 241.
12. Dean-Jones, *Women's Bodies in Classical Greek Science*, p. 244.
13. Jordanova, *Defining Features*, pp. 97–99.
14. Ibid., p. 99.
15. John Tosh, 'What Should Historians Do with Masculinity?', p. 183.
16. Ibid., p. 183.
17. Stefan Collini, *Public Moralists: Political Thought and Intellectual Life in Britain 1850–1930* (Oxford: Clarendon Press, 1991), p. 186.

18. Donald E. Hall, 'The End(s) of Masculinity Studies', *Victorian Literature and Culture* 28 (2000), 228–229.
19. John Pettegrew, 'Deepening the History of Masculinity and the Sexes', *Reviews in American History* 31 (2002), 136. The term 'notawoman' definition of manhood can be found in Robert S. McElvaine, *Eve's Seed: Biology, the Sexes, and the Course of History* (New York: McGraw-Hill, 2001), p. 58.
20. Susan Stanford Friedman, 'Beyond White and Other: Relationality and Narratives of Race in Feminist Discourse', *Signs: Journal of Women in Culture and Society* 21:1 (Autumn 1995), p. 9.
21. Stefan Dudink, 'The Trouble with Men: Problems in the History of Masculinity', *European Journal of Cultural Studies* 1:3 (1998), p. 427.
22. Jordanova, *Defining Features*, p. 60. In recent years, there have been growing calls from gender historians to also treat the 'gentleman' as a gendered ideal. See, for example, Solinger, *Becoming the Gentleman*; Williamson, *British Masculinity in the 'Gentleman's Magazine'*.
23. Schiebinger, 'The Philosopher's Beard'.
24. Steven Shapin, 'The Man of Science', in Katharine Park and Lorraine Daston, eds., *The Cambridge History of Science Volume 3: Early Modern Science* (Cambridge: Cambridge University Press, 2003), p. 179.
25. Ibid., p. 179.
26. White, *Thomas Huxley*, p. 8.
27. See Tosh, 'What should Historians Do with Masculinity?'; Heather Ellis and Jessica Meyer, 'Introduction' in Heather Ellis and Jessica Meyer, eds., *Masculinity and the Other: Historical Perspectives* (Newcastle upon Tyne: Cambridge Scholars Publishing, 2009), pp. 1–19.
28. See p. 2, 5–6.
29. Golinski, 'Humphry Davy's Sexual Chemistry', p. 15.
30. Jan Golinski, *Making Natural Knowledge: Constructivism and the History of Science, with a New Preface*, p. 66.
31. See, for example, June Purvis and Amanda Weatherill, 'Playing the Gender History Game: A Reply to Penelope J. Corfield,' *Rethinking History* 3:3 (1999), p. 335: Purvis and Weatherill criticize the history of masculinity as 'a male tool used in an attempt to dissipate women's power whereby women become historically

viable subjects only when placed alongside men, thus reinforcing their position as "other"'.

32. Watts, *Women in Science*, p. 6.
33. Zack, *Bachelors of Science*, p. 6.
34. Ibid., p. 2.
35. Ibid., p. 16.
36. Jan Golinski makes this point clearly in Golinski, *Making Natural Knowledge*, p. 66.
37. See Jim Endersby: *Imperial Nature: Joseph Hooker and the Practices of Victorian Science* (Chicago: University of Chicago Press, 2008), pp. 20–30; Ruth Barton, ''Men of Science''.
38. Steven Shapin's remark that a gender history perspective is unnecessary in his chapter 'The Man of Science' in Park and Daston, eds., *Cambridge History of Science Volume 3* (p. 179) is typical here.
39. Shapin, 'A Scholar and a Gentleman'.
40. For other studies of male scholarly identity, see William Clark, *Academic Charisma and the Origins of the Research University* (Chicago: University of Chicago Press, 2008); Richard Kirwan, ed., *Scholarly Self-Fashioning and Community.*
41. Shapin, 'A Scholar and a Gentleman', p. 290.
42. Ibid., p. 290.
43. Ibid., p. 291.
44. Francis Bacon, 'The Advancement of Learning,' in eds., James Spedding and Robert Leslie Ellis, *The Works of Francis Bacon: Philosophical Works, vol. 3* (London: Longman and Co. et al., 1870), p. 268.
45. According to Anthony J. Funiari, 'the trope of male sexual maturation plays a fundamental role in structuring Bacon's conception of his instauration'. See Anthony J. Funiari, *Francis Bacon and the Seventeenth-Century Intellectual Discourse* (New York: Palgrave Macmillan, 2011), pp. 61–62.
46. Rob Iliffe, 'The Masculine Birth of Time: Temporal Frameworks of Early Modern Natural Philosophy', *British Journal of the History of Science* 33 (2000), p. 443.
47. Ibid., p. 442.
48. Ibid., p. 443.
49. Ibid., p. 451.

50. Thomas Shadwell, *The Virtuoso*, eds., Marjorie Hope Nicolson and David Stuart Rodes (London: University of Nebraska Press, 1966), p. xviii.
51. *Tatler* 3:31 (10–12 January 1709/10) cited in Shapin, 'A Scholar and a Gentleman', p. 307.
52. Samuel Butler, 'The Abuse of Learning: Fragments of a Second Part', in Samuel Butler, *Satires and Miscellaneous Poetry and Prose*, ed., Rene Lamar (Cambridge: Cambridge University Press, 1928), p. 166.
53. Shadwell, *The Virtuoso*, p. 4.
54. Gerard Langbaine, *An Account of the English Dramatick Poets* (Oxford: George West and Henry Clements, 1691), pp. 451–2. Cited in Thomas Shadwell, *The Virtuoso*, p. xiii.
55. See, for example, Norman Vance, *The Sinews of the Spirit: The Ideal of Christian Manliness in Victorian Literature and Religious Thought* (Cambridge: Cambridge University Press, 1985).
56. Timothy Alborn, 'The Business of Induction: Industry and Genius in the Language of British Scientific Reform, 1820–1840', *History of Science* 34: 102 (1996), pp. 91–121.
57. See Judith L. Fisher, '"In the Present Famine of Anything Substantial": *Fraser's* "Portraits" and the Construction of Literary Celebrity'; or, 'Personality, Personality Is the Appetite of the Age', *Victorian Periodicals Review* 39:2 (2006), p. 97.
58. Richard Henry Horne, *Exposition of the False Medium and Barriers Excluding Men of Genius from the Public* (London: Effingham Wilson, 1833), p. 234.
59. Ibid., p. 88.
60. Ibid., pp. 89–90.
61. Ibid., pp. 234–235.
62. *The Morning Chronicle* (Monday, 4 December 1826).
63. Ibid.
64. On the 'Decline of Science' debate, see William H. Brock, 'The Decline of Science' in William H. Brock, *Science for All: Studies in the History of Victorian Science and Education* (Aldershot: Ashgate, 1996), pp. 1–9.
65. Although the use of the term 'macaroni' to indicate a foppish follower of French fashions did not come into widespread usage until the eighteenth century, it is worth noting that Samuel Butler

described the intellectual abilities or 'Pedants Skill' of the virtuoso as even 'more Insignificant [than] … Modern Macaronique Linsywolse' as early as the 1660s. Butler, *Satires and Miscellaneous Poetry and Prose*, p. 165.

66. [Henry Brougham], 'The Bakerian Lecture on the Theory of Light and Colour', *Edinburgh Review* 1:2 (January 1803), 450.
67. [Brougham], 'The Bakerian Lecture on the Theory of Light and Colour', 451.
68. Ibid., p. 452.
69. Ibid., p. 452.
70. Ibid., p. 452.
71. See p. 28.
72. *The Bristol Mercury* (12 November 1827).
73. *The Bristol Mercury* (11 June 1827).
74. *The Times* (14 December 1829), p. 3.
75. [Augustus Bozzi Granville], *Science Without a Head; Or the Royal Society Dissected. By One of the 687 F.R.S.---sss.* (London: T. Ridgway, 1830), p. 76.
76. Sir James South, *Charges Against the President and Councils of the Royal Society* (London: B. Fellowes, 1830), p. 13.
77. [Granville], *Science Without a Head*, p. 93.
78. Ibid., p. 20.
79. Ibid., p. 51.
80. See Golinski, 'Humphry Davy's Sexual Chemistry.' Jan Golinski, 'Humphry Davy: The Experimental Self'.
81. Fisher, '"In the Present Famine of Anything Substantial"', 98.
82. *The Times* (14 November 1827) p. 3.
83. *The Morning Post* (16 December 1830).
84. Ibid.
85. Ibid.
86. Sir Alexander Crichton to Roderick Impey Murchison (24 November 1830), cited in J.B. Morrell and A. Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science* (London: Royal Historical Society, 1984), p. 31.
87. Golinski, *Making Natural Knowledge*, p. xiii.
88. Although Timothy Alborn has remarked that the 'problem as [the reformers] saw it was not a lack of native genius'. See Alborn, 'The Business of Induction', p. 94.

89. [Gerrit Moll], *On the Alleged Decline of Science in England, By a Foreigner* (London: T. and T. Boosey, 1831), p. 3.
90. Sir James South, 'Royal Society' (Letter to the Editor), *The Times* (Friday, 11 January 1829), p. 4.
91. 'Abuses in the Royal Society', *The Lancet* 14:34 (3 April 1830), p. 16.
92. 'The Royal Society and the Duke of Sussex', *The Lancet* 15:382 (25 December 1830), p. 443.
93. Ibid., p. 444.
94. Charles Babbage, *Reflections on the Decline of Science in England, and on Some of its Causes* (London: B. Fellowes, 1830), p. 141.
95. [David Brewster], 'Decline of Science in England', *Quarterly Review* 43: 86 (October 1830), p. 309.
96. Ibid., p. 309.
97. Ibid., p. 317.
98. Ibid., p. 315.
99. Ibid., p. 318.
100. Ibid., pp. 330–331.
101. David Brewster to Charles Babbage (12 February 1830) in eds., Morrell and Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 24.
102. David Brewster to James David Forbes (10 July 1830) in eds., Morrell and Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 27.
103. [Brewster], 'Decline of Science in England', p. 320.
104. Ibid., p. 341.
105. Ibid., p. 305.
106. Ibid., p. 305.
107. Babbage, *Reflections on the Decline of Science in England*, p. 58.
108. Ibid., p. 21.

CHAPTER 3

New Masculine Heroes: Davy, Bacon and the Construction of the Gentleman-Scientist

'A Powerful and Manly Mind'

While the early nineteenth century witnessed widespread worries about the British man of science, it also saw the creation of new models of scientific masculinity, intimately bound up with shifts in contemporary understandings of gender identity. According to James Secord, 'The role for the enquirer into nature was also being transformed, from older images of scholarship and learning to the new ideal of the heroic discoverer, engaged single-mindedly in the investigation of nature.'[1] Jan Golinski has described the turn of the nineteenth century as a 'critical moment', witnessing a 'profound transformation' in the development of the identity of the male scientist. Stressing in particular, the influence of Romanticism, Golinski writes that, '[t]he years around the turn of the nineteenth century brought to prominence models of male creativity that stressed imagination and the emotions, rather than classical rationality'.[2]

Against this background, new possibilities, distinct from the traditional roles of pedant-scholar and foppish amateur opened up for the man of science. The scientific poet and what Golinski has termed the 'scientific hero' were two of these. 'Scientific heroes' were men 'whose contributions to knowledge were stamped by their origin in strenuous physical exertion'. 'The scientific hero had its archetype in the figure of Alexander von Humboldt', writes Golinski, 'a man whose wanderings and bodily sufferings were widely viewed as exemplary for the seeker after knowledge in such fields as geology and natural history.'[3] In a British context,

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
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the geologist Charles Lyell offered a comparable model of the scientific hero. With his dedication to challenging field trips and physical fitness, he embodied the emerging figure of the 'man of knowledge in action' which promised to turn on its head received images of the effete and reclusive scholar. As Secord puts it so well, Lyell 'did not sit in a stove-heated room as Descartes had done two centuries before, but instead explored bandit-infested country with hammer in hand'.[4] Despite much that has been written about the ambivalent masculinity of the Romantic hero, with many historians remarking upon his androgyny,[5] and even effeminacy, David Higgins makes the important point that the Romantic hero was most often viewed at the time as 'a virile masculine figure'.[6]

In the context of British science, Sir Humphry Davy emerges as the leading exponent of this new model—an almost exact contemporary with Alexander von Humboldt. Although from a provincial background, having moved from the Bristol Institution to London and the patronage of Joseph Banks, president of the Royal Society, Davy soon became a fully integrated and familiar face among the capital's social and scientific elite. In particular, he was appointed as Chemistry Lecturer at the Royal Institution, founded and managed by members of the aristocracy. He was a charismatic and successful lecturer, regularly drawing large crowds of men and women. Like later popular scientific lecturers, Tyndall and Faraday, Davy studied his technique and presentation carefully to maximize the impact on his audience. As Golinski has shown, gendered language played an important part in Davy's self-presentation. He deliberately set himself up as an active, masculine alternative to the traditional, passive scholar. 'Displaying the effects of such forces as electricity', Golinski writes, 'Davy was simultaneously displaying his command of them through his instruments. The possession of apparatus like the voltaic pile, by which natural forces could be controlled, was projected as an integral part of the identity of the experimental philosopher.'[7] Spectacle, exhibition and the public display of experiments became an important part of the new model of scientific masculinity, fostered by Davy and taken over by the BAAS.[8]

Davy was also a compulsive poet and used his poetry to articulate his vision of the Romantic hero-scientist. Instead of the isolated scholar in his university cell, Davy pictured the manly scientist in the solitude of the outdoors. In a youthful poem from 1796 (published by Robert Southey in 1799), Davy praised men of science as the 'Sons of Genius' and 'sons of nature'. It is almost as if he was describing scientists themselves as the 'masculine birth of time' looked for by Bacon some two hundred years earlier.

'Sons of Genius' clearly betrays the Romantic inspiration of Davy, with the first line describing a seascape strongly reminiscent of Samuel Taylor Coleridge's *The Rime of the Ancient Mariner*. As Higgins has shown, the language of 'genius' was central to new models of masculinity developed within the crucible of Romanticism. 'In early nineteenth-century Britain', he wrote, 'there was an unprecedented interest among writers and readers in the subject of genius, and in particular, in examining and discussing the personal characteristics and life histories of "great men".'[9] While the term 'genius' was most commonly used in connection with poets and men of letters, as we see from Davy's poem, it was also applied to men of science. As Simon Schaffer has shown, a focus on craft-skill or the 'ingenuity' of natural philosophers, preeminent in the early modern period, increasingly gave way to discussion of individual 'genius' in the late eighteenth century.[10] The distinctions between men of letters and men of science were far less rigid in the Romantic period than in the later nineteenth century. In his own poetry, Davy described himself as both 'philosopher' and 'poet'.[11] The neglect of genius was a key theme of Romantic literature, and if we recall the prominence of this topic in the complaints of Brewster, Babbage and South, a strong case can be made for viewing the whole 'Decline of Science' debate as Romantic in nature.[12]

In his poem, 'Sons of Genius', Davy takes issue directly with traditional views of the natural philosopher as retiring and effeminate. He does not apologize for scientists' love of solitude. By placing it outside in nature, he transfigures it into a manly virtue—evidence of genius no less. Genius, wrote Davy, 'loves the silent solitary hours … the stillness of the starry night, / When o'er the brightening view Selene pours / The soft effulgence of her pensive light. / Tis then disturb'd not by the glare of day / To mild tranquillity alone resign'd, / Reason extends her animating sway / O'er the calm empire of the peaceful mind.'[13] Through this Romantic imagery, Davy held up the possibility of British men of science finally ending the centuries-old opposition between the figure of the scholar and the gentleman which Shapin has so carefully traced. Here, finally, was an urbane and cultivated gentleman (albeit with provincial origins) who was also a brilliant and accomplished man of science.

What is more, it seems that Davy anticipated the fact that some critics would remain convinced of scientists' effeminacy because of the close affinity with nature which he emphasized, a trait traditionally associated with women. However, as Davy stressed in 'Sons of Genius', it was not simply nature's beauty which men of science loved but also her terror

and harshness. 'Yet not alone delight the soft and fair', he wrote. 'Alike, the grander scenes of Nature move, / Yet not alone her beauties claim their care, / The great, sublime, and terrible, they love. / The sons of Nature they alike delight / In the rough precipice's broken step, / In the black terrors of the stormy night. / And in the thunders of the threatening deep.'[14] Here we see Davy arguing that male scientists can also be hardy men of the outdoors. His reference to their 'delight in the rough precipice's broken step' recalls the contemporary enthusiasm for geology with its expeditions to remote regions. In addition to chemistry, Davy was a keen geologist just like many of the founding members of the BAAS such as Buckland, Harcourt and Murchison. It was precisely in this image which Davy fashioned his men of science in 'Sons of Genius': 'Whilst all around the midnight torrents pour, / And awful glories beset the face of night, / They wear the silent solitary hour.'[15] Now, solitude is something to be 'worn' with manly pride; the former sign of effeminacy and shame has been transformed into a badge of masculine endurance. Men of science become both part of and superior to nature: 'Like yon proud rocks amidst the sea of time / Superior scorning all the billow's rage, / The living Sons of Genius stand sublime, / The immortal children of another age.'[16]

Yet Davy was no straightforward Romantic writer. While he drew heavily on Romantic idiom, in particular the close affinity of the scientist to nature, in order to reimagine science as a manly pursuit, he did not share the Romantic scepticism towards mechanical systems of science. According to Andrew Cunningham and Nicholas Jardine, Romanticism was 'deeply hostile' to Newtonian mechanics. Such systems were thought to have 'debased nature to the level of a uniform machine, without past and future'.[17] As we learn from 'Sons of Genius', however, Newton was a particular hero of Davy's ('Or on Newtonian wings sublime to soar').[18] As well as the Romantic notion of science as a search for truth, in the words of his biographer, David Knight, Davy embodied the 'vision of the power of applied science'. More than any of his contemporaries, Davy developed a range of technical applications from his chemical research which had a huge impact on society, from protecting the copper sheathing of ships' hulls against the corrosive effects of salt water to the development of the miner's safety lamp.[19]

In the inaugural lecture of his chemistry course at the Royal Institution in 1802, Davy set out a radical vision of scientific masculinity which focused on the ability of men of science to control and direct nature for the

benefit of humanity as a whole. He drew an explicit contrast with the traditional image of the isolated scholar. 'Informed … by his experiments', he declared, the man of science is able 'to interrogate nature with power, not simply as a scholar, passive and seeking only to understand her operations, but rather as a master, active with his own instruments'.[20] Crucially, Davy did not limit this power to men of science alone; he argued that through their mastery of nature, scientists had enhanced the masculine power of mankind as a whole. Employing almost sexual imagery, reminiscent of Bacon, Davy describes the advancement of his own science, chemistry, as enabling an overtly masculine 'man(kind)' to dominate (female) nature:

> Not contented with what is found upon the surface of the earth, he has penetrated into her bosom, and has even searched the bottom of the ocean for the purpose of allaying the restlessness of his desires, or of extending and increasing his power. He is to a certain extent ruler of all the elements that surround him, and he is capable of using not only common matter according to his will and inclinations, but likewise of subjecting to his purposes the ethereal principles of heat and light.[21]

In addition to the 'passive' figure of the scholar who seeks 'only' to understand the operations of nature, Davy also opposed the masculinity of scientists to male 'savages' who are 'quietly and passively submissive to the mercy of nature and the elements'. Through this analogy, men of science are linked decisively with a masculine vision of modernity defined by 'vivid feelings of hope' and 'thoughts of permanent and powerful action', while traditional scholars are identified with 'apathetic' and 'uncultivated savages'.[22] Building on his earlier valorization of the scientist's love of solitude by placing it in the wilds of nature in 'Sons of Genius', here, in his inaugural Royal Institution lecture, Davy succeeded in painting a radical new role for the male scientist, marked by clarity of vision and a dominating sexual power.

Humphry Davy, Francis Bacon and the BAAS

In his inaugural lecture at the Royal Institution, delivered almost thirty years before the BAAS was founded, Davy articulated a vision of what science might become, remarkably similar to that put forward in the early days of the Association. In a much later letter to *The Times* written in 1830 by the astronomer, James South, we learn that Davy had been equally concerned about the 'decline of science' which had helped to spark the

establishment of the BAAS. He had himself written a substantial pamphlet of 'some 30 or 40 pages' on the subject.[23] We recall Davy's use of sexual imagery in describing the relationship between men of science and an ostensibly female nature ('he has penetrated into her bosom'). One of the then local secretaries of the BAAS, Sir William Hamilton, at the fifth annual meeting in Dublin in 1835 employed strikingly similar metaphors of sexual conquest (this time mixed with classical imagery) when outlining the main features and objectives of the newly established body. Its task, he declared, was 'to tear fold after fold away which hung before the shrine of nature; to penetrate, gloom after gloom, into those Delphic depths, and force the reluctant Sibyl to utter her oracular responses'.[24]

Yet the links between Davy and the founders of the BAAS were more than just coincidental. Davy had been an important figure singled out by a number of those centrally involved in the Decline debate and the establishment of the British Association. Davy had been invoked as a potential hero of a revived science from his early years lecturing at the Royal Institution. In an article from 1808 in which Henry Brougham was reviewing Davy's delivery of the Bakerian Lecture, he praised Davy as a manly thinker despite the unmanly surroundings he worked in, by which he meant the public lectures (which attracted large female audiences) of the Royal Institution. For Brougham, Davy was 'this ingenious and indefatigable inquirer', a man of great energy, who had made the most important discoveries since Newton. Referring to reports that Davy might give 'elegant' and 'sycophantic' names to his newly discovered metals, that 'in this courtly age, some terms might be introduced complimentary to the best of Sovereigns, and the purity of the Church establishments', Brougham replied that he 'well knew that no such thing was ever long listened to by the discoverer himself, whose sentiments are as free and manly as if he had never inhaled the atmosphere of the Royal Institution'.[25] We remember from an earlier article reviewing the 1802 Bakerian Lecture by the polymath and physician, Thomas Young, that Brougham was no believer in the innate manliness of men of science. Indeed, in that article he had denounced Young as a lazy and effeminate fop.[26]

Davy, moreover, was one of two men of science (along with the French chemist, Joseph Proust) whom Babbage explicitly invoked as manly alternatives to the isolated scholar in his *Reflections on the Decline of Science in England*. 'If we look at the fact', he wrote, 'we shall find that the great inventions of the age are not … always produced in universities. The doctrines of "definite proportions", and of the "chemical agency

of electricity"—principles of a high order, which have immortalized the names of their discoverers—were not produced by the meditations of the cloister.'[27] In what effectively constituted a double obituary for Davy and William Hyde Wollaston, two of British science's 'brightest ornaments', Babbage set up Davy as the dynamic, manly exemplar of the future of British science. He remarked upon the 'curiously different structures of their minds', describing 'caution and precision' as the 'predominant features of the character of Wollaston', while '[a]mbition constituted a far larger ingredient in the character of Davy' who 'with the daring hand of genius … grasped even the remotest conclusions to which a theory led him'.[28] While Wollaston's model was rejected as too austere and cautious for the new century, Davy was exalted as a figure who was both an excellent scholar and a bold and dynamic inventor, committed to solving real-world problems. Crucial here was Davy's dedication to the practical application of his research. 'The influence of electricity in producing decompositions', declared Babbage, was no doubt of 'inestimable value as an instrument of discovery in chemical inquiries'; yet, it was Davy's application of the principle 'to the practical purposes of life', to 'arrest the corrosion of copper-sheathing of vessels' which most clearly demonstrated his 'powerful genius'.[29]

Davy thus featured strongly as an example to be emulated in the Decline debate which provided the immediate context for the foundation of the BAAS as well as some of its earliest leading lights including Babbage and Brewster. In his role as president of the Royal Society until his resignation due to ill health in 1827, Davy's support was eagerly sought by individuals keen to reform British science, many of whom became active members of the BAAS after 1831. We may place the effective founder of the BAAS and its first General Secretary, William Vernon Harcourt, in this category. Harcourt had been friends with Davy from his youth and had been taught privately by him after leaving Oxford. In 1824, Davy wrote to Harcourt acknowledging the honour done to him by his recent election as an honorary member of the Yorkshire Philosophical Society. This was the body which formed an important precursor to the BAAS, hosted its first meeting in 1831 and furnished many of its early members.[30] Likewise, in the early years of the British Association, Davy's name and example were repeatedly drawn upon by those seeking to direct the activities and aims of the new body. He was, for example, one of very few British heroes of science identified by the organizers of the 1837 meeting in Liverpool and whose names, painted

in large letters in a style similar to Pharaonic cartouches, were chosen to adorn the walls of the main venue.[31]

Davy functioned as a model for the nascent British Association in a much wider sense, however. More than any other contemporary, he offered a vision of what a revived Baconian science might look like. As early as 1802 in his inaugural lecture at the Royal Institution, Davy, like Bacon, had stressed the vital importance of collective effort across the different sciences to further progress and of applying the results of scientific research to the practical challenges of everyday life. 'The man of true genius', he declared,

> who studies science in consequence of its application—pointing out to himself a definite end, will make use of all the instruments of investigation which are necessary for his purposes; and in the search of discovery, he will rather pursue the plans of his own mind than be limited by the artificial divisions of language. Following extensive views, he will combine together mechanical, chemical, and physiological knowledge, whenever this combination may be essential.[32]

In reviewing his later work which resulted in the development of the miner's safety lamp, John Playfair began by noting that Bacon had complained that 'at the time when he wrote, … science could hardly boast of a single experiment which had served to increase the power, and to diminish the suffering, or to augment the happiness of mankind'.[33] He went on to praise Davy's lamp as 'exactly such a case as we should choose to place before Bacon, were he to revisit earth, in order to give him … an idea of the advancement which philosophy has made, since the time when he had pointed out to her the route which she ought to pursue'.[34] As Davy's brother John recalled in his 1839 account of his life, Davy, when president of the Royal Society, had longed to realize Bacon's vision of Salomon's House, to refashion science as a vigorous and masculine pursuit, as had been intended when the body had been originally founded over a century earlier. 'It was his wish', he wrote, 'to have seen the Royal Society an efficient establishment for all the great practical purposes of science, similar to the college contemplated by Lord Bacon, and sketched in his New Atlantis.'[35] Accepting that Davy had 'effected very much less than he wished',[36] the challenge was left to be taken up by the founders of the British Association.

Historians of science have repeatedly stressed the importance of Bacon's vision of science, in particular his ideal of Salomon's House

in the *New Atlantis*, to the establishment of the BAAS.[37] Morrell and Thackray have argued that Bacon had 'provided in his Salomon's House an institutional blue-print for the Association to follow' and, like others, have noted that 'Harcourt took the title for the new Association from the *Novum Organum*, and its programme from the *New Atlantis*'.[38] A. D. Orange went further, arguing that '[i]f, as Emerson says, an institution is the lengthened shadow of one man, then the Association carried with it the unmistakable profile of Francis Bacon'.[39] In his opening address to the first meeting of the BAAS, held at York, in 1831, Harcourt was clear about the importance of Bacon to the Association's aims and employed words very similar to those Davy had spoken to his brother about his hopes for the Royal Society: 'The eldest of our scientific Institutions contemplated, in its origin', he declared, 'the objects which we now propose to pursue. The foundation, Gentlemen, of the Royal Society was an attempt to reduce to practice the splendid fiction of the New Atlantis.'[40] Shortly before this remark, in the same speech, Harcourt lamented the recent loss of Davy and his guiding 'genius'.[41]

For Harcourt and the other founders of the BAAS, including Babbage and Brewster, Davy embodied, perhaps more than anyone else, the dynamic, sociable, problem-focused man of science which Bacon had advocated two hundred years earlier; and Harcourt used his opening address to emphasize his hope that the new Association would succeed in fashioning future men of science in Britain after this model. It was his wish to give 'a new impulsive and directive force' to science which would muster and extend 'all the scientific strength of Great Britain'. Bacon, he declared, had complained that 'science had never possessed a "*whole man*"' because no man of science had ever been made free, financially, to devote himself entirely to his research.[42] Comparing his own time, he lamented that 'science, even to the present day, can scarcely be said to possess more than *fractions of men*'.[43] It was one important task of the Association, he argued, 'to detach a number of ingenious men from everything but scientific pursuits, to deliver them … from the embarrassments of poverty …, to give them a place and station in society the most respectable and independent'. Drawing on the imagery we encountered many times in our discussion of the Decline debate in Chapter 2, Harcourt noted that, since Bacon's day, men of science in Britain had been progressively unmanned, unable to maintain the financial independence necessary to masculine authority and respectability. 'All, I think, must allow', he declared, 'that it is neither liberal, nor politic to keep those, who employ the rarest intel-

lectual endowments in the direct service of the country, upon a kind of *parish allowance*'.[44]

To realize Bacon's vision, 'to revive in the nineteenth century a plan devised two centuries ago',[45] Harcourt implored the assembled scientists to emulate the models of Bacon and Davy, to offer themselves as living examples of active, dynamic, socially engaged men of science. Referring to Bacon, Harcourt declared that 'this great interpreter of nature stood among philosophers like the pilot among the crew; he constructed the chart of knowledge …, he took the bearings of the land …, he noted the force and direction of the winds, and taught the adventurer to steer a course over the wide and trackless sea.'[46] Maintaining the nautical theme, in a stirring vision of masculine strength, Harcourt declared to the assembled men of science:

> There is a light in the distant horizon to which we have eagerly looked, and complained that the current did not set us more quickly towards it; and the question now before you, Gentlemen, is no less than this: Whether you are satisfied still to float passively on the waters, or whether you will raise the sail, and ply the oar, and take the helm into your hands.[47]

In this metaphor, Harcourt showed clearly the role that he considered heroes of science like Bacon and Davy to play in the future of the BAAS. They would function as inspirations, as leaders, but in the spirit of Bacon's vision, success would require the 'power of combined wisdom and concerted labour'.[48] In Harcourt's words, the Association must not look merely to the 'luminaries who may chance to shine in this year, or that—in a decade of years, or a generation of men', but also to 'the numbers engaged, effectively, though less conspicuously, in adding by degrees to our knowledge of nature'.[49]

In this vision, the individual energy and activity of Humphry Davy was to provide a template for the collective project of the BAAS which aimed at nothing less than the restoration of the lost masculine vigour of science. In Harcourt's opening address, he described the Royal Society as having become 'effete' in the centuries since its foundation and, citing Bacon, set out one of the prime objectives of the BAAS as being to give science 'whole men', independent, masculine, respectable, instead of broken, emasculated, 'fractions of men'.[50] This view of the BAAS as a powerful collective masculine endeavour explicitly separated the Association from the traditional view of the isolated scholar and soon became embedded within its public

image. At the fifth annual meeting in 1835, the then Secretary, William Hamilton, declared that the Association hoped to advance science chiefly 'through the agency of the social spirit'.[51] Recalling Davy's insistence in 'Sons of Genius' that the solitude sought by men of science was manly and daring, located outside in the wilds of nature, so Hamilton stressed that even in their solitude, men of science were essentially social. 'In the very silence and solitude of its meditations', he declared, 'still genius is essentially sympathetic; is sensitive to influences from without, and fain would spread itself abroad, and embrace the whole circle of humanity, with the strength of a world-grasping love.' In this view, he argued, even 'the *ascetics* of science … those who seem to shut themselves up in their own separate cells, and to disdain or deny themselves the ordinary commerce of humanity … are found, after all, to be … influenced by the *social spirit*'. Even the isolated scholars of science, were, not really isolated. Indeed, he proclaimed, it was 'to use the power' and 'guide the influences' of 'that social spirit, that deep instinctive yearning after sympathy' that the BAAS had been founded.[52]

An Aristocratic Association: Combining Scientist and Gentleman

It was not simply in advocating the active collaboration of men of science across disciplinary boundaries that Davy had propounded a 'social' view of science. While Hamilton's explanation of the 'social spirit', to which he so frequently referred, certainly embraced the active cooperation of scientists from the same and different fields, it also covered the simpler meaning of personal association and sociability. 'We meet, we speak, we feel *together*', he declared. 'The excitement with which this air is filled will not pass away at once … [T]hose influences will be with us long … they will cheer, they will animate us still, when this brilliant week is over'.[53] He referred to the intrinsic need which men of science, like all human beings, felt for friendship, for meeting together. 'We must never forget', he continued, 'that the social feelings make up a large and powerful part' of the human soul, and he likened the emotions he hoped to kindle at BAAS meetings to 'that familiar and every-day love which joins us in common life to the friends whom we esteem'.[54]

As president of the Royal Society Davy had worked hard, as Joseph Banks had before him, to promote gentlemanly sociability among men of

science. As Christopher Lawrence has written, 'throughout his life Davy's idea of genius was pre-eminently social.' 'Genius', for Davy, 'was not raving or mad or betrayed in the solitary researches of the alchemist or the frenzied composing of a delirious poet.'[55] Despite his provincial origins (often remarked on by historians), Davy was socially adept, urbane and cultured. From his earliest days at the Royal Institution, his sociability was intensely aristocratic. He mixed easily with the Institution's noble patrons and soon became a staple fixture of elite metropolitan society. According to his biographer, David Knight, Davy soon became 'much sought after as a dinner party guest'.[56] With his impeccable social connections and fondness for sociability, Davy was a natural choice for the presidency of the aristocratic Royal Society. He was also keen to promote scientific research among the gentry and aristocracy. As Steven Shapin has correctly identified, a key feature of the Royal Society's original foundation had been the wish to unite the traditionally separate figures of the scholar and the gentleman. Just as Davy had been keen to see the Royal Society approximate more closely to Bacon's vision under his leadership, so he worked hard to advocate science as a 'gentlemanly' pursuit. 'I have often wondered', he wrote,

> … that men of fortune and rank do not apply themselves more to philosophical pursuits; they offer a delightful and enviable road to distinction, one founded upon the blessings and benefits conferred on our fellow creatures … the glory resulting from them is permanent, and independent of vulgar taste and caprice.[57]

This did not mean that Davy sought a reunification of the scholar and gentleman *per se*; rather, to employ Shapin's terminology, he wanted to 'respecify' the notion of gentility to incorporate scientific research. The figure of the scholar, as we have seen, tended to be used as a negative oppositional model against which the masculine identity of the male scientist was constructed. Worried by the twin evils of the isolated pedant-scholar and the foppish amateur, those involved in the Decline debate were as keen as Davy to see the emergence of the gentleman-scientist, who promised to avoid the excesses of both. As we have seen, from Harcourt's opening address of 1831, the BAAS defined itself, in many ways, against the Royal Society. Harcourt argued, for example, that the older body had failed to live up to its Baconian aspirations. In the correspondence of the BAAS's founding members, the Royal Society was repeatedly referred to, using gendered language, as the 'Old Lady', whom they feared was now

in terminal decline.[58] The implied contrast with the newly founded British Association was clear—theirs was to be the youthful, dynamic organization which realized Bacon's vision of a 'masculine' science. As Thomas Traill argued in his Secretary's Address of 1837, 'the British Association … can scarcely reckon a period of infancy; it sprang at once from the conception of its founders, like Pallas from the head of Jove, in the perfection of youthful vigour … It … has [since] attained a colossal magnitude that distinguishes it above every other scientific association in the British Empire'.[59]

Despite this self-confidence, though, the British Association opted to retain important features of the Royal Society including its atmosphere of aristocratic sociability. Despite its very different, public mission to spread popular awareness of scientific knowledge and advances, and its decision to open its meetings to the public at large, in its inner organization it remained profoundly orientated towards the nobility and gentry. Despite the confidence of Traill and others, the BAAS still had a lot to prove. Science was still considered a parvenu area of knowledge by many and was forced to borrow heavily from established sources of cultural authority. At the top of the list was the aristocracy. Here, Davy was once more a valuable model as he had worked hard to show that scientific research, newfangled though much of it might seem, posed no threat to the established social order. 'The unequal division of property and of labour', he had declared in 1802, 'the difference of rank and condition amongst mankind, are the sources of power in civilized life, its moving causes, and even its very soul.' 'In considering and hoping that the human species is capable of becoming more enlightened and more happy', he continued, 'we can only expect that the great whole of society should be ultimately connected together by means of knowledge and the useful arts.'[60]

Aristocratic involvement had been central to the vision of the Association held by its founders even before its official establishment. For David Brewster, the key advantage to aristocratic sponsorship was access to government and the potential to raise the value of science in the estimation of politicians. In a letter written in June 1830, Brewster urged Babbage to let him know 'what impression your book [*Decline of Science*] has made upon men in power'. 'Many of our nobility', he continued, 'though not scientific, would willingly promote such a great object, and an association rightly constituted would have influence enough to direct the existing government to a system of measures which would put England on a level with other nations.' More directly, in the conclusion to his review of Babbage's *Decline* in the *Quarterly Review* in October 1830, Brewster

declared that 'An association of our nobility, clergy, gentry and philosophers, can alone draw the attention of the sovereign and the nation to this blot upon its fame.'[61] Thus, it was not merely the aristocracy's political influence, but their general cultural authority that was attractive to the advocates of the new Association who sought not merely to influence government but to raise the perceived value of science across the nation as a whole.

The importance of aristocratic influence in the early phase of the BAAS has long been acknowledged by its historians.[62] In their 1981 study of the early years of the BAAS, Morrell and Thackray identified 'aristocratic approval' as a 'central' factor in its success. 'Creating a powerful agency', they wrote, 'meant identifying with power; power meant land; land meant aristocracy.'[63] In the first ten years of the BAAS's existence, there were no less than six aristocratic presidents including at their first meeting at York when Viscount Milton, later Earl Fitzwilliam, occupied the chair. Between 1836 and 1838, we see a particularly impressive series of aristocratic presidencies, beginning with the Duke of Northumberland, followed by the Earl of Burlington, in 1837 and finally, the Marquess of Lansdowne in 1838. Even the following year in 1839 when a scientific president was chosen—Harcourt himself, Murchison was still urging in the run-up that a local nobleman, Lord Dartmouth 'should take the chair at an early meeting of the Local Council, to give weight and character to the resolutions of that body by which they will invite the nobility, gentry and inhabitants of the surrounding region to flock in at our approaching festival'.[64] Writing to Harcourt in April 1839, Murchison reported that Brewster 'has the strongest *objection* to any man of science being at our head'. Moreover, he wrote, this view was shared by so many in the BAAS that 'we never can again venture to propose a mere man of science except at the great universities. In a mixed great society like that of Glasgow [where the next meeting was to be held], commercial and agricultural, it is absolutely essential that some public person should be at our head, who can influence the masses.'[65] The clear implication here was that a man of science was not a 'public person … who can influence the masses' but rather a private person, cloistered away in his cell—the image of the isolated scholar.

As Morrell and Thackray have shown, as well as aristocratic presidents, membership of the Association also rose rapidly among the nobility in the early years of its existence.[66] It was a particular coup to win over the reluctant Duke of Sussex, sixth son of George III, and president of the Royal Society, to their cause. Initially sceptical, fearing the BAAS as a rival to

the Royal Society, he was persuaded by Murchison not only to attend the second meeting at Oxford, but also to become a member. In addition to acting as presidents, local members of the aristocracy would throw house parties and private dinners for selected Association members, both before and after annual meetings. They would also frequently pay for much of the popular entertainment provided for BAAS members, contribute luxury foods and make sizeable donations to Association funds. As Morrell and Thackray have written, 'Aristocracy began and maintained a characteristic British Association style of festive feasting.'[67] Such noble sponsorship had clearly not been traditional for scientific gatherings outside the Royal Society, underlining the very different social world with which scientists had previously been associated. At the 1837 meeting in Liverpool, visiting men of science were treated to 'mountains of venison and oceans of turtle' with the geologist, Adam Sedgwick, asking, 'Were ever philosophers so fed before? … Twenty hundred-weight of turtle were sent to fructify in the hungry stomachs of the sons of science!'[68] This social distance apparent between the aristocracy, courted so assiduously by the BAAS founders in the early years, and many practising men of science confirms the survival well into the nineteenth century of the substantial gap between the scholar and the gentleman which Shapin observed for the seventeenth and eighteenth centuries.

As we have seen, historians of the BAAS have long recognized the strategic role which the aristocracy played in legitimating science as a valuable 'cultural resource' in the early years of the Association's life. What they have paid less attention to, however, is the effect which aristocratic sponsorship and sanction had upon the public image and reputation of the man of science *per se*. The aim, on the part of the BAAS's founders, I would argue, was not simply to use the glamour and 'élan' of the aristocracy to shore up the claims of science to a greater share of public and government attention; they also hoped that the man of science himself would finally be freed from his longstanding association with the effete figure of the scholar, that he might merge fruitfully with the glamorous and influential aristocrat, to create a new masculine character, the gentleman-scientist. We recall that Davy had expressed a similar wish shortly before he died in 1829, namely that far more 'men of fortune and rank' might 'apply themselves … to philosophical pursuits'.[69] In seeking to associate themselves and the man of science with the figure of the aristocratic gentleman, the founders of the British Association were attempting to draw on the cultural authority of the dominant (some would argue, hegemonic) masculinity of the time.[70]

In the early years of the BAAS, therefore, it was not merely men of the aristocracy who were sought out by its founding members, but specifically those with a clear interest in science. Such men were often able to demonstrate clearly the potential of science when it was united with wealth and rank. A good example is provided by the house party thrown by the BAAS president in 1843, the Earl of Rosse, at Birr Castle after the meeting in Cork. The highlight, timed to coincide with the entertaining of the British men of science, was the mounting of the Earl's huge reflecting telescope, some six feet in diameter and fifty-four feet in focal length. The effect it had upon Cambridge mathematician George Peacock is clear from his description of the event: 'Whatever met the eye was upon a gigantic scale: telescopic tubes, through which the tallest man could walk upright; telescopic mirrors, whose weights are estimated … by tons; solid masonry more lofty and massive than … a Norman keep.'[71]

In their 1981 study, Morrell and Thackray included a revealing sentence characterizing the nature of the parties and other occasions during early BAAS meetings where nobility and men of science mingled. 'These important social occasions', they wrote, 'cemented loyalties to the Association and consolidated a manly fraternity of aristocrats and savants.'[72] Here, the gendered term 'manly' is deployed without additional reflection, but its use is worth greater consideration in a study like this. For, given all we have learned about the gendered connotations of scholarship and science on the eve of the foundation of the BAAS, in particular the views of male scientists during the Decline debate, it was precisely the aim of the Association's founders, not merely to 'consolidate', but to construct for the first time, a 'manly fraternity of aristocrats and savants'. The word 'fraternity', though, chosen by Morrell and Thackray to describe the relationship between the men of science and the aristocracy, seems to imply a greater degree of equality and parity of esteem in terms of 'manliness' than was certainly present in the early meetings of the British Association. This is hinted at elsewhere, when they quite rightly state that 'in its early days the Association was deeply dependent on an aristocratic constituency, with its history, its property, its education, its respectability, and its élan'.[73] Science did not simply gain cultural authority as a type of knowledge and set of practices by associating with the nobility; the masculine reputation of men of science themselves was also significantly and visibly enhanced by the example of noblemen on display at BAAS meetings and social gatherings.

Although all of the attributes highlighted here by Morrell and Thackray would have formed part of the aristocracy's masculine appeal—their

history, property, education, respectability—it is their élan, with its connotations of masculine energy and military vigour, which perhaps best encapsulates all these various elements into one phrase and which offers itself as the closest synonym for 'masculinity' used at the time. When we read the explanation offered by the antiquary, James Yates, as to why he felt the Marquess of Northampton was the best man to be president at the Liverpool meeting in 1837, we get the impression that it was precisely this intangible masculine quality of the nobleman he was trying to articulate: 'My own impression, regarding at once rank and station, character, scientific attainments … popular manner and talent as a speaker, is that the Marquess of Northampton is the fittest man.'[74]

The masculine appeal of the aristocrat was a complex intermixing of many different factors and reminds us of the similarly elusive combination of qualities desired in the ideal president of the Royal Society we discussed in Chapter 2. Here, we should remember that, for many, aristocratic glamour had been essential in deciding for the Duke of Sussex over the 'merely scientific' man, John Herschel, in the 1830 contest for the Royal Society chair.[75] Almost the same arguments were rehearsed when the decision was taken to approach the Marquess of Lansdowne to be president at the 1836 Bristol meeting of the BAAS. Above all, it was the 'great éclat' his name would 'give … to the Meeting' which argued in his favour.[76] At several of the early meetings we likewise see leading men of science participating in traditionally aristocratic masculine pastimes. According to the *Literary Gazette*, to celebrate the elevation of the geologist, William Buckland, to the BAAS presidency in 1832, 'a regiment of cavalry, two hundred strong, was assembled on Magdalen Bridge'. Buckland himself, hammer in hand, 'put himself at the head of this class á cheval, which forthwith sallied forth to explore the geological wonders of the neighbourhood'.[77]

Actors and Audience: Masculine Performance at BAAS Meetings

If we turn to look more closely at the pageantry and ritual associated with the early meetings, we get a clearer sense of what aristocratic masculinity, or éclat, actually looked like. Partly this was about communicating a strong, masculine image of science outside the Association—in other words it was about the public image of science and the man of science. Brewster described this effect very well in 1832. 'The pageant … of a numerous and imposing assemblage', he wrote in the *Literary*

Gazette, 'constitutes the real working power of the Association. It is the brawny arm with which the intellectual giant is to procure his food, and to smite his enemies, and to extend his domain.'[78] As Brewster phrased it so well—the pageantry and performance was a demonstration of intellectual masculine power in a public space. Above all, it involved a clear sense of performance before a range of audiences including, in the first instance, one's male scientific peers. When contemplating how such a body as the British Association might function, Brewster imagined a healthy 'scientific rivalry' as the driving force, where the less experienced would be inspired to emulate the 'great men' of science listening to their papers. 'The young aspirant after fame is encouraged in his pursuits by having such individuals as his audience', he wrote, 'and the working members derive new zeal from the approbation of their more elevated colleagues.'[79] In this view, a visible hierarchy of authority and reputation among men of science was crucial to the successful functioning of meetings as sites of masculine performance. Inexperienced scientists attended in the hope of being noticed and promoted by the so-called 'lions', or great men of science, whose participation was a key goal of organizers of scientific gatherings.[80]

In essence, these lions, great discoverers and inventors like Davy and Dalton, the recipients of Royal Society medals and the like, were the intellectual or scientific aristocracy of their day, shedding a comparable, though arguably less radiant, lustre upon early meetings of the BAAS. Following Goethe's famous claim that 'every discovery is property', historians like Simon Schaffer have directly compared the benefits of being recognized as a great discoverer or inventor with those accruing from wealth and birth.[81] In important ways, the organization of the scientific community in Britain in the early 1830s mirrored that of society more broadly, led, in both cases, by a small, self-selecting elite, an aristocracy, whether of wealth or intellect. In many cases, the original lions were men of high birth *and* scientific talent—men like Alexander von Humboldt, the German aristocrat, whose private fortune allowed him to travel the world pursuing his scientific interests. When he died in 1859, there was widespread recognition that without his high birth and personal wealth he would not have become the scientific hero whose life they were celebrating—'the pride and the delight of his contemporaries in both hemispheres', one of 'those few powerful minds, who … appear only once in the course of centuries, and represent, combined in them, the Science of their times, in its many branches'. This recognition is clear in the form of memorial which his friends (including those in the BAAS) chose for him—the establishment

of a Foundation 'designed to promote scientific talent wherever it appears, in all those branches, in which Humboldt developed his scientific energy, viz.—in works of Natural History, and distant travel'.[82]

The idea of an intellectual aristocracy was a popular one in the years surrounding the foundation of the BAAS. Particularly influential was Samuel Taylor Coleridge's notion of the clerisy—an intellectual elite, who ideally would govern not only the world of science but society as a whole. Coleridge criticized his friend Humphry Davy for 'prostituting and profaning the name of "Philosopher"' by giving it to 'every Fellow, who has made a lucky experiment'.[83] So much did he dislike the term's wide distribution that he banned it from the 1833 BAAS meeting at Cambridge.[84] Coleridge believed in a sharp, stratified divide among men of science—between the clerisy, on the one hand—those who made discoveries and constructed theories—and the general cultivators of science, who carried out day-to-day scientific labours. This distinction was likewise popular among the leading lights of the BAAS in its early years. It is particularly noticeable in the discussion of the role of lions at BAAS meetings. Bacon too had employed a similar division in the organization of science in his vision of the *New Atlantis*. At the top of the scientific hierarchy were the 'lamps' and 'interpreters', those who carried out original experiments and guided the labours of the rest, known variously as 'depredators', 'compilers' and 'pioneers'. It is clear from their correspondence that these distinctions were in the minds of the founding members of the BAAS and were important in constructing their own identities as men of science. In a letter written by the geologist, William Conybeare, to William Vernon Harcourt on 19 September 1831 shortly before the first meeting at York, Conybeare applied Bacon's distinctions directly to the nascent Association. Babbage and Herschel he described as 'lamps and interpreters', while he identified himself as a 'poor depredator and compiler insulated in a remote country residence'.[85]

Above all, it was the possession of 'genius' which was held to distinguish the 'great men' of science, the lamps and philosophers from the rest. As Schaffer and others have shown, discovery was fast becoming the proof of scientific talent and masculinity in the first decades of the nineteenth century. In his *Life of Sir Isaac Newton*, published in 1831, Brewster declared that 'nothing even in mathematical science can be more certain than that a collection of scientific facts are of themselves incapable of leading to discovery'. Newton, by contrast, he argued, had shown 'the impatience of genius' which 'never will submit to the plodding drudgery

of inductive discipline'.[86] This was in part an attack on the increasingly popular claim that anyone employing scientific method (by which was meant Baconian induction) correctly could discover new scientific truths. Brewster, Whewell and other leading lights of the BAAS argued passionately against this idea, maintaining that discoverers, akin to Bacon's lamps and Coleridge's philosophers, were much rarer—driven, not by a particular method, but by an innate masculine power—genius.

William Whewell, for example, divided male scientists into two classes, those he termed the 'great men', or discoverers, on the one hand, and the 'true men' or humble labourers, on the other. These latter were those who were not capable of making discoveries themselves but who were responsible for integrating the findings of the great men into the existing body of scientific knowledge and making known new discoveries. For Whewell, distinctions of masculinity among men of science were key to the success of the whole enterprise. Everyday cultivators of science ought not to view the men of genius with jealousy but instead acknowledge their own inferiority and embrace the opportunity to aid those more talented in the common pursuit of science. They should 'feel themselves called upon to sympathize with the struggles and successes, the hopes and anticipations of the great men of their time, whose names and discoveries would be an inheritance to later generations'.[87] In writing thus, Whewell reproduced a familiar argument for the continued existence and privileged status of the aristocracy within society. Just as many great events in Britain's past were frequently linked to the actions of members of the aristocracy, so Whewell's *History of the Inductive Sciences* (1837) explained the progress of science in terms of a series of discoveries attributed to the genius of a few superior minds.

In James F. W. Johnston's account of the 1830 meeting of the Gesellschaft Deutscher Naturforscher und Ärzte in Hamburg, published in Brewster's journal to gather support for the establishment of a comparable body in Britain, we get a vivid impression of the ways in which the sociability of such gatherings fostered the masculine reputations of scientists among their male peers. Following the entrance of a famous man of science, Johnston presents the following scene:

> [A]nd 'who is that?—who is that?' goes from one to another; and then there is a move of the men who know him, or have heard of and wish to know him, and the rest are beginning to resume their conversation, when a second interruption arises from the entrance of another *great man* in

> another science, and another set of men is set on the *qui vive*, and thus perhaps another hour may be most delightfully spent in merely looking on, studying the physiognomy, and in watching the phrases of expression and deep interest that pass over the countenances of different individuals by the mere presence and contact of others, votaries of the same branch of study, whom they have hitherto known only by their labours, but whom, though unseen, they have deeply venerated.[88]

Recounting the early history of the BAAS, Morrell and Thackray liken the atmosphere in the various scientific sections to fighting a 'contest' in a 'boxing ring' where individual 'reputations were made and broken'.[89] Up until this point, active debate and discussion of arguments presented by peers had not formed a particular feature of scientific societies in Britain. The chief exception was the Geological Society of London, whose lively meetings had acted in part as a model for the BAAS. A number of leading members of the Geological Society, established in 1807, went on to act as founders of the British Association: men like Roderick Impey Murchison and Adam Sedgwick. In an 1837 address before the BAAS, William Whewell praised the 'manly vigour of discussion' at the Geological Society,[90] while Joseph Beete Jukes, writing later in 1854, reported that meetings were characterized by 'the collision of various intellects, … displays of personal strength and skill, knightly combats'.[91]

Another key audience for validating the masculine reputations of men of science 'performing' at annual meetings was the local population who paid to come and see the lions. In describing the 1830 gathering of the German scientific body in Hamburg, Johnston recorded not only the response of other scientists to the great discoverers of the day but also of the public at large. When a famous scientist walked past the cafes of central Hamburg, Johnston describes the following melee: '… at the cry "*da geht ein Naturforscher* …", there was a hustling and a jostling, a knocking over of chairs and tables, and a scrambling for hats, as everyone hurried to the door to see …'[92] The foundation of the BAAS came at a time when newspapers and periodicals, witnessing a period of unprecedented growth, were beginning to create a cult of celebrity in their pages for the first time. The 1830s have been identified by historians as a time particularly receptive to the creation of new masculine heroes. Leo Braudy has highlighted the decade as a key turning point in the development of a modern idea of celebrity,[93] while Coleridge himself referred to the 1830s as 'the age of personality'.[94] This growing interest in the private lives of famous men

has often been identified as a key feature of the Romantic movement, characterized, as Andrew Cunningham and Nicholas Jardine have argued, by intense 'reflexion', with 'the self' standing 'in unprecedentedly high esteem'.[95] While aristocrats still received top billing, the press quickly took to reporting on BAAS meetings and the 'great men' who were attending. David Higgins writes that from the early nineteenth century, the type of men who might become popular heroes was widening, largely as a result of a growing periodical culture which enabled the public to be much more actively involved in the construction of great men.[96] Leo Braudy links this wider range of popular masculine heroes to a broader shift from an aristocratic to an increasingly democratic society characterized by new routes to fame and fortune.[97]

This view may be seen as an adaptation of Bourdieu's argument that 'independent intellectuals' were made possible by the development of a separate public sphere, through mass printing, journals and the emergence of a literate middle class.[98] The 1830s witnessed an explosion of biographical sketches or 'portraits' of masculine heroes in popular periodicals. Judith Fisher has explored a series of thirty-eight such portraits (published between 1830 and 1838 in *Fraser's Magazine*) entitled 'Fraser's Gallery of Illustrious Literary Characters'.[99] This particular series largely reflected the contemporary Romantic interest in the lives of poets and writers; however, it also began to include portraits of scientists among its gallery of 'illustrious characters', men such as David Brewster and Michael Faraday.[100] Significantly, at the same time, it commissioned a series of biographical sketches dedicated to men of science, or 'eminent philosophers' as *Fraser's Magazine* termed them. It is significant that it was one of the founding members of the BAAS and a man whose life they had already covered in the 'Gallery of Illustrious Literary Characters'—Sir David Brewster—who they asked to write these sketches.

In this move, we see men of science beginning to emerge as a category of great men distinct, for the first time, from men of letters. When setting out the scheme in his first portrait—of Isaac Newton—in October 1832, Brewster argued that this new interest in men of science as masculine role models marked a 'wholesome' departure from recent practice in biographical literature which had been 'confined principally to the natural history of players, the duplicities of politicians, the ravings of German maniacs, and the visions of men who drink alcohol, eat opium, and swallow corrosive sublimate'.[101] In laying before the public such shining examples of masculine achievement as Sir Isaac Newton and the Marquis de la Place,

'two men … whose discoveries relate to the grandest and most permanent objects which the human mind can contemplate … whose names have in all lands been emblazoned in the lists of immortality',[102] Brewster underlined the recent shift—perhaps linked with the foundation of the BAAS—to include men of science among masculine heroes acceptable to the public.

As David Higgins has shown in relation to periodicals, by discussing 'genius' and 'Mind', a journal like *Fraser's Magazine* 'also celebrates and elevates its readers as exceptionally able individuals who are capable of appreciating and sympathizing with great writers like Wordsworth'.[103] There is a sense in which the greatness being celebrated is democratized and shared out, albeit in lesser degrees, among a wider public. By presenting scientific lions to popular audiences at BAAS meetings, a similar compliment was being paid—the audience was assumed to be cultivated enough to recognize and appreciate scientific genius. In this way, the growth of a mass scientific movement like the BAAS may be seen as part of the same phenomenon as the explosion of periodicals in the 1830s—the growth of a middle-class public sphere which generated its own heroes. In these circumstances, it was possible for something as seemingly exclusive and rare as scientific genius to act as a 'unifying cultural force'.[104] While the early years of the BAAS saw clear divisions between men of science themselves, and between men of science and the public, the language of genius, conceived as part of a Baconian vision of collaborative labour, did become a shared language of collective masculinity.

In anticipating a forthcoming visit of the BAAS to his native town of Belfast in 1852, the naturalist, Robert Patterson, spoke of 'the gratification in seeing and hearing the illustrious men with whose works and names we have been so long familiar, and of treasuring up the tones of their voices, and the expressions of their countenances, and the characteristics of their manner, to future hours of meditation'. Above all, he concluded, 'these visits tend to inspire respect for science, and for those who cultivate it.'[105] The arrangements for the meetings themselves were often set up to create an elaborate stage on which to display the masculinity of the men of science present. Harking back to the vision of scientific masculinity we encountered in Humphry Davy's poem, 'Sons of Genius', field trips and visits to nearby sites of interest were frequently used to showcase the power of science (and men of science) over nature. A great example of this is the timing of the ceremonial laying of the foundation stone of the Clifton Suspension Bridge on the final morning of the BAAS

meeting in Bristol in 1836. In this stirring scene, with 'both sides of the river … crowded with animated human life', the ability of science to subdue nature (captured in the bridge itself and the figure of its engineer, Brunel) was unmistakeably combined with the lustre of aristocracy as the BAAS president, the Marquess of Northampton, laid the foundation stone 'to a fanfare of trumpets and cheers'.[106] A similar scene attended the meeting of the BAAS two years later in Newcastle when the Durham Junction Railway with its impressive Victoria Bridge was officially opened. 'The sun shone brilliantly', the publisher and antiquary, Moses Aaron Richardson, recorded: 'the South Shields band played the national air; cannons roared; flags waved in the breeze; thousands of voices sent forth a shout of joy … Indeed a scene better calculated to give an elevated opinion of the triumph of genius over nature can scarcely be conceived.'[107] At the Plymouth meeting in 1841, the battleship Hindostan was launched 'amidst the cheers of assembled thousands' who, in the words of Morrell and Thackray, 'tacitly understood the combined appeals of science, invention, patriotism, imperialism, and maritime domination'.[108] Spectacle and display were, they rightly claim, needed to 'render visible the majesty of science', to make it 'manifest'.[109]

The same was true for the masculinity of men of science themselves. Carefully staged lectures by the scientific lions designed to appeal to and impress the local population at meetings had a powerful effect. 'Great scientific heroes, previously mere names in print, were … made flesh', declare Morrell and Thackray. 'It was the actual presence and the performances of scientific giants which always confirmed the supporters of the Association', they write, 'and often converted doubters to it.' At the Glasgow meeting in 1840, for example, one local paper, the *Glasgow Constitutional* had been opposed to the visit, but confessed it had changed its mind because of the sheer number of 'great men—great by birth and great by talent' who took part.[110] Once more, we see that auspicious mix of aristocratic flair and scientific reputation. Something similar was captured at the 1838 meeting in Newcastle when geologist Adam Sedgwick lectured to several thousand working-class men and women on the beach. In the words of John Herschel, writing to his wife: 'All the show here is over. It has been by far the most brilliant meeting of the Association.' The highlight was 'an out-of-door speech … which [Sedgwick] read on the sea-beach at Tynemouth to some 3,000 or 4,000 colliers and rabble … which has produced a sensation such as is not likely to die away for years'. It is 'impossible', he continued,

> to conceive the sublimity of the scene, as he stood on the point of a rock a little raised, to which he rushed as if by a sudden impulse, and led them on from the scene around them to the wonders of the coal-country … then to the great principles of morality and happiness, and at last to their relation to God, and their own future prospects.[111]

In this image, Sedgwick appears the very embodiment of the active, inspirational scientific hero. Yet, it is clear from his focus on morality and social order that his elevated social status lent him an additional aura of authority. Another geologist, Roderick Impey Murchison, recorded a similar experience two years later at the Glasgow meeting in 1840. He recalled 'the glorious day at Arran, when I lectured to a good band of workmen with every peak of Goatfell illumined, and marched up at close of the day to Brodrick Castle, with the Heir of the House of Douglas, preceded by the piper'.[112] Here, perhaps, more clearly than anywhere else, we see the powerful union of aristocracy and science achieved by the BAAS in its early years.

'Elegant Females' and 'Fashionable Ladies'

Mixed-sex sociability was a key part of aristocratic culture and was central to the civilizing role of knowledge during the Enlightenment. Morrell and Thackray specifically identified the involvement of women as a 'major factor in the change from natural knowledge as a remote and cloistered virtue to science as a public resource'.[113] The participation of women in the early years of the BAAS was also vital to the transformation of the public reputation of the man of science from a retiring, effete scholar to an active, socially engaged gentleman-scientist. The first ever *conversazione*, which mirrored elite mixed-sex social gatherings on the continent, took place at the first BAAS meeting at York in 1831. The *Yorkshire Gazette* focused on the prominence of 'elegant females' and 'fashionable ladies' and noted how the presence of well-dressed women altered the perception of science itself: '[T]he charms of beauty and the varied stores of philosophy seemed united', it declared.[114] Although the geologist William Buckland, when BAAS president in 1832, made clear his view that women ought not to attend the scientific part of meetings, he confessed they were nonetheless vital to the public image of the Association. '[T]heir presence at private parties is quite another thing', he declared, '—and at these I think the more ladies there are, the better.'[115]

Despite the reservations of Buckland and some others, women increasingly found their way into the scientific parts of the annual meetings including the sectional discussions. With the huge, largely female, audiences regularly attending lectures at the Royal Institution in London and other venues, there was growing pressure to admit women to all parts of BAAS meetings. Indeed, there was a strong argument to be made for admitting women to sectional discussions in terms of boosting the masculine reputations of the male scientists presenting their work. We have already discussed the delivery of papers before the sections as a form of masculine performance and display. While masculinity could certainly be validated by peers within an all-male audience, women also had an important role to play in terms of confirming the masculine reputations of male speakers. The obvious admiration of his largely female audiences had been a significant factor in establishing Humphry Davy's reputation as a Romantic hero of science. As Golinski has written: 'His deportment as a lecturer at the Royal Institution made use of conventions of masculine display before an audience that was, to a significant degree, female. The command of his audience that Davy achieved was a significant resource in making his reputation as a discoverer.'[116] A number of leading BAAS members in the early years of the Association's history made a similar point about the role of women at meetings—that they stimulated the assembled men of science to fresh exertions. During the Oxford meeting in 1832, Adam Sedgwick referred to the ladies' gallery as 'that blazing crescent which had decorated the meetings' and spurred the philosophers on to new efforts. William Whewell and Sedgwick pushed hard for the increased presence of the wives and daughters of scientists at meetings as they were convinced it encouraged a gentlemanly atmosphere and produced the 'desired éclat'.[117]

This view of the potentially positive role of female audiences in helping to construct the public masculine reputations of male scientists is confirmed in the results of recent research carried out by Charles Withers and Rebekah Higgitt. Considering female audiences for Section E (Geography), they write that 'women provided a successful foil to the heroic, manly explorers they flocked to hear'. In this way, they helped to reinforce the gendered dichotomy central to the British Association's self-understanding in its early years between 'male expert/female audience'.[118] Withers and Higgitt argue that, in general, women were content to adopt a passive, admiring role when watching and listening to male scientists at BAAS meetings. 'Seeing and describing the scientific lions

took a prominent place in women's accounts of BAAS meetings', they write.[119] Reflecting, indeed, on the masculine qualities of the various men of science they encountered was a favourite activity according to a study of women's diaries. They would try to discern their mental character or traces of the hardships they had endured by scrutinizing their faces and deportment. Certainly, some of the thoughts recorded by women attending BAAS meetings at the time confirm this impression. Sara Jane Clarke, for example, wrote that she was 'truly impressed by the manner and presence' of scientists like Thomas Romney Robinson and David Brewster.[120] Harriet Martineau thought that women chiefly attended BAAS gatherings 'to sketch the *savans*'.[121] *The Times* likewise reported of the 1836 meeting in Bristol that the 'softer portion' of the audience were 'on the full gaze, to see what kind of creature a philosopher was'.[122]

This admiration on the part of female audiences, moreover, seems to have been directly encouraged by the men of science themselves. Their perceived attractiveness to women became part of their masculine image and something they worked hard to secure. Caroline Fox, for example, records Adam Sedgwick as 'saying many soft things to the soft sex' at the 1852 meeting in Belfast.[123] We gain a little more detail from a letter written by John Herschel to his wife in 1838, relating an earlier example of Sedgwick's flattery: 'Sedgwick said, in his talk on Saturday', he wrote, 'that the ladies present were so numerous and so beautiful that it seemed to him as if every sunbeam that had entered the windows in the roof (it is all windows), had deposited there an angel.'[124] When writing to Charles Daubeny about the arrangements for the 1832 Oxford meeting, Babbage stressed the 'importance' of 'enlist[ing] the ladies in our cause'. The participation of ladies guaranteed a gentlemanly atmosphere, he argued, ensuring that 'scientific men mix more in general society, and that the more intelligent amongst the upper classes … get a little imbued with love for science'. He positively extolled the value of female admiration. '[R]emember the dark eyes and fair faces you saw at York', he urged Daubeny, 'and pray remember that we absent philosophers sigh over the eloquent descriptions we have heard of their enchanting smiles.'[125] Like so much in the first years of the BAAS, this practice built on the earlier behaviour of Humphry Davy at the Royal Institution. Golinski has shown well how Davy actively flirted with his female audience and revelled in their attentions towards him.[126]

The role of women in the masculine self-fashioning of men of science at British Association meetings is also visible in the function these gatherings

performed as what Susan David Bernstein has called a 'marriage market clearing house'.[127] When male scientists complimented their female audience members, they might very well discover their future mate within the crowd. This was the case for many scientists who attended BAAS meetings including Joseph Hooker who met two of his future wives there and Charles Babington as well. Frequently, relationships formed at British Association gatherings reinforced the socially exclusive nature of the BAAS as an organization. Morrell and Thackray tell the story of Paulina Jermyn, the daughter of a local rector who attended the Cambridge meeting in 1833, and met her future husband there—Walter Calverley Trevelyan. He was a member of the sectional committee for geology and geography and the heir to a baronetcy with extensive estates in Northumberland and Somerset. Educated at Oxford under Buckland and good friends with Brewster he was a typical gentleman-scientist on the model cultivated by the British Association. The couple met in the aristocratic atmosphere characteristic of the early meetings, sealing a union which then perpetuated the same kind of elite sociability: 'The Trevelyans', we are told, 'went on to play an active role in the Association's affairs. In 1838 they entertained Buckland, Whewell, Murchison and Brewster at their Northumberland home; in 1840 they went with Buckland and Louis Agassiz on their Highland "glacier hunt" following the Glasgow meeting.'[128]

Certainly many diaries covering BAAS meetings reveal details of ilicit romantic liaisons and sexual encounters.[129] Such was the reputation of Association gatherings for the fostering of romantic relationships by the later years of the nineteenth century that newspapers and magazines took it up as the subject of satire. In 1877, for example, *Punch* related the story of Professor Edwin Brown and Dr Angelina Jones. In the Professor's imaginary letter to his new lady love, we see the awkwardness which still resulted when the figure of the sexually confident and amorous male encountered the traditionally reclusive and effete world of science. 'At the Professors' ball to-night Our orbits crossed; and still Throbs on my arm of fingers light The sweet magnetic thrill. Like twin spheres through ellipses …'[130]

By the end of their first decade, the BAAS had succeeded in carving out a new public image for itself and the man of science. Banished, certainly, from their chosen ideal was the effete and reclusive scholar. In some ways, it could be argued that they succeeded in marrying the figure of the male scientist with the ideal of the gentleman. Many of their first presidents and vice-presidents were prominent members of the

aristocracy; noblemen with residences near to the location of Association meetings feted the philosophers with turtle, venison and other fine food. The model of sociability on display at annual meetings was distinctly aristocratic with banquets, balls and wine receptions, *conversaziones* and garden parties. The participation of ladies, in particular, especially in the evening activities, reflected the desired connection with high society. It is important to remember, though, that the decision to court the British nobility in this way and to hold up Sir Humphry Davy as a model to be emulated reflects not the strength of science in the early 1830s, but its relative weakness and lack of cultural authority.

Notes

1. Secord, *Visions of Science*, p. 6.
2. Golinski, 'Humphry Davy's Sexual Chemistry', p. 18.
3. Ibid., p. 19.
4. Secord, *Visions of Science*, p. 159.
5. See Golinski, 'Humphry Davy's Sexual Chemistry', p. 26.
6. David Higgins, *Romantic Genius and the Literary Magazine: Biography, Celebrity, Politics* (Abingdon: Routledge, 2005), p. 6.
7. Golinski, 'Humphry Davy's Sexual Chemistry', p. 23.
8. On the history of spectacle and display in science, see, for example, Mary Baine Campbell, *Wonder and Science: Imagining Worlds in Early Modern Europe* (Ithaca: Cornell University Press, 1999). Bernadette Bensaude-Vincent and Christine Blondel eds., *Science and Spectacle in the European Enlightenment* (Aldershot: Ashgate, 2008); Iwan Rhys Morus, *Frankenstein's Children: Electricity, Exhibition, and Experiment in Early-Nineteenth-Century London* (Princeton, N.J.: Princeton University Press, 1998).
9. Higgins, *Romantic Genius and the Literary Magazine*, p. 1.
10. Simon Schaffer, 'Genius in Romantic Natural Philosophy' in Andrew Cunningham and Nicholas Jardine eds., *Romanticism and the Sciences* (Cambridge: Cambridge University Press, 1990), p. 82.
11. John Davy, *Memoirs of the Life of Sir Humphry Davy* Vol. 2 (London: Longman, Rees, Orme, Brown, Green and Longman, 1836), p. 260.
12. See Higgins, *Romantic Genius and the Literary Magazine*, p. 10.
13. Davy, *Memoirs of the Life of Sir Humphry Davy*, Vol. 2, p. 22.

14. For a detailed study of the sublime in relation to science and technology, see David E. Nye, *American Technological Sublime* (London: MIT Press, 1994), especially Chapter 1.
15. Davy, *Memoirs of the Life of Sir Humphry Davy*, Vol. 2, p. 25.
16. Ibid., p. 27.
17. Cunningham and Jardine eds., *Romanticism and the Sciences*, p. 6.
18. Davy, *Memoirs of the Life of Sir Humphry Davy*, Vol. 2, p. 26.
19. David Knight, *The Making of Modern Science: Science, Technology, Medicine and Modernity: 1789–1914* (Cambridge: Polity, 2009), p. 56.
20. Humphry Davy, 'A Discourse Introductory to a Course of Lectures on Chemistry,' in Humphry Davy, *Early Miscellaneous Papers, from 1799–1805* (London: Smith, Elder & Co., 1839), p. 319. Cf. here David E. Nye's study of the 'technological sublime' or the 'emotional configurations that emerge from new social and technological conditions'. In a phrase strongly evocative of Davy's description of the effect of his experiments, Nye argues that technological 'sublimity lay in realizing that man had directly 'subjugated' matter, and this realization was a collective experience'. See Nye, *American Technological Sublime*, pp. xvii; 62. Davy's reference to 'his own instruments' here is also important. Iwan Rhys Morus (*Frankenstein's Children*, p. xi) has suggested that there were two competing visions of science and scientific practice in early nineteenth-century Britain: one driven by skilled artisans and instrument makers, embodied in public displays of experiments, the other, elite, dominated by highly trained specialists and characterized by 'a highly abstracted view of nature, divorced from instruments and apparatus'. Even though Davy was catering primarily for a middle- and upper-class audience, he placed huge emphasis on carefully staged display, publicly demonstrated experiments and the power of his instruments.
21. Davy, 'A Discourse Introductory to a Course of Lectures on Chemistry', p. 318.
22. Ibid., pp. 318–319.
23. James South, 'The Royal Society', *The Times* (Saturday 8 May 1830), p. 2.
24. *Proceedings of the Fifth Meeting of the British Association for the Advancement of Science, held in Dublin* (Dublin: Philip Dixon Hardy, 1835), p. 29.

25. [Henry Brougham], 'The Bakerian Lecture on Some New Phenomena of Chemical Changes', *Edinburgh Review* 12:24 (July 1808), p. 399.
26. [Brougham], 'The Bakerian Lecture on the Theory of Light and Colour', p. 452.
27. Babbage, *Reflections on the Decline of Science in England*, p. 21.
28. Ibid., pp. 203–204.
29. Ibid., p. 16.
30. Sir Humphry Davy to William Vernon Harcourt (21 January 1824) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 16.
31. Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 273.
32. Davy, 'A Discourse Introductory to a Course of Lectures on Chemistry', in Davy, *Early Miscellaneous Papers,* p. 315.
33. [John Playfair], 'Sir H. Davy on the Fire-Damp', *Edinburgh Review* 26:51 (February 1816), p. 233.
34. Ibid., p. 240.
35. John Davy ed., *The Collected Works of Sir Humphry Davy, Volume I: Memoirs of his Life* (London: Smith, Elder & Co., 1839), p. 271.
36. Ibid., p. 271.
37. See, for example, Jack Morrell and Arnold Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science* (Oxford: Clarendon Press, 1981), p. 267.
38. Ibid., p. 267.
39. Orange, 'The Idols of the Theatre', p. 293.
40. *Report of the First and Second Meetings of the British Association for the Advancement of Science* (London: John Murray, 1833), pp. 23–24.
41. Ibid., p. 22.
42. Ibid., p. 23.
43. Ibid., p. 26.
44. Ibid., p. 33.
45. Ibid., p. 30.
46. Ibid., p. 25.
47. Ibid., p. 39.
48. Ibid., p. 31.

49. Ibid., p. 22.
50. Ibid., pp. 26–27.
51. *Report of the Fifth Meeting of the British Association*, p. 28.
52. Ibid., p. 29.
53. Ibid., p. 28.
54. Ibid., p. 29.
55. Christopher Lawrence, 'The Power and the Glory: Humphry Davy and Romanticism' in Cunningham and Jardine eds., *Romanticism and the Sciences*, p. 221. Indeed, as we have seen, it was a perceived excess of such sociability which had led to increasing criticism and condemnation of the Royal Society as part of the Decline debate in the years leading up to the establishment of the British Association for the Advancement of Science.
56. David Knight, 'Davy, Sir Humphry, baronet (1778–1829)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edn, Jan 2011 [http://www.oxforddnb.com/view/article/7314, accessed 2 April 2016].
57. Sir Humphry Davy, *Consolations in Travel, Or the Last Days of a Philosopher* (London: J. Murray, 1830), p. 226.
58. See, for example, Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, pp. 112, 136. Compare the comments of Joseph Banks, president of the Royal Society for forty years, who lamented in 1818: 'I see plainly that all these new-fangled associations will finally dismantle the Royal Society, and not leave the Old Lady a rag to cover her.' John Barrow, *Sketches of the Royal Society Club* (London: John Murray, 1849), p. 10.
59. *Report of the Seventh Meeting of the British Association for the Advancement of Science* (London: John Murray, 1838), p. xxvi. In this view, the BAAS provided a solution to the problem identified by Davy in his inaugural Royal Institution lecture of 1802, where he had complained that science remained in a comparative state of infancy, requiring urgent maturation and masculinization. 'The human mind has been lately active and powerful', he declared, 'but there is very little reason for believing that … it has [yet] attained its adult state. We find in all its exertions … the awkwardness of youth. It has gained new powers and faculties, but … is as yet incapable of using them with readiness and efficacy. Its desires are beyond its abilities; its different parts and organs are not firmly

knit together, and they seldom act in perfect unity.' Davy, *Early Miscellaneous Papers*, p. 321.

60. Lawrence, 'The Power and the Glory' in Cunningham and Jardine eds., *Romanticism and the Sciences*, p. 214.
61. [Brewster], 'Decline of Science in England', 341–342.
62. See, for example, Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 109.
63. Ibid., p. 109.
64. Murchison to Harcourt (8 November 1838) in Morrell and Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 292.
65. Murchison to Harcourt (26 April 1839), cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 117.
66. Ibid., p. 109.
67. Ibid., p. 113.
68. Adam Sedgwick to Mrs Lyell (16 October 1837), cited in ibid., p. 113.
69. See p. 60.
70. For the idea of the 'gentleman' as the dominant model of masculinity in Georgian England, see John Tosh, 'Gentlemanly Politeness and Manly Simplicity in Victorian England', *Transactions of the Royal Historical Society* 12 (December 2002), p. 455. For the argument that the 'gentleman' and 'gentlemanliness' constituted a hegemonic masculinity, see Gillian Williamson, *British Masculinity in the 'Gentleman's Magazine', 1731–1815* (Basingstoke: Palgrave Macmillan, 2016), pp. 6–7.
71. George Peacock, 'Address', *Report of the Thirteenth Meeting of the British Association for the Advancement of Science, held at Cork in August 1843* (London: J. Murray, 1844), p. xxxi. Cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 114.
72. Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 113.
73. Ibid., p. 118.
74. James Yates to William Vernon Harcourt (20 June 1836) cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 116.

75. See p. 37.
76. James Cowles Prichard to William Vernon Harcourt, 3 November 1835. Cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 116.
77. *Literary Gazette* (1832), p. 442.
78. [David Brewster], 'The British Scientific Association', *Edinburgh Review* 60:122 (1835), p. 388.
79. [Brewster], 'Decline of Science in England', p. 325.
80. Writing to Michael Faraday, one of the 'lions' he hoped to attract to the upcoming first meeting at York, Harcourt urged him that at this time of year 'the *lions* may be allowed to perambulate the country' and that he hoped to both 'see' and 'show' 'lions' at York. See William Vernon Harcourt to Michael Faraday (Friday 5 September 1831), cited in Morrell and Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 56.
81. See, for example, Simon Schaffer, 'Scientific Discoveries and the End of Natural Philosophy', *Social Studies of Science* 16:3 (August 1986), pp. 387–420.
82. Bodleian Library (hereafter BL) Dep. BAAS 5, p. 222.
83. Samuel Taylor Coleridge (1804), cited in Trevor H. Levere, *Poetry Realized in Nature: Samuel Taylor Coleridge and Early Nineteenth-Century Science* (Cambridge: Cambridge University Press, 1981), p. 73.
84. [William Whewell], 'On the Connexion of the Physical Sciences', *Quarterly Review* 51: 101 (March 1834), p. 59.
85. Morrell and Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 65.
86. David Brewster, *The Life of Sir Isaac Newton* (New York: J. & J. Harper, 1831), pp. 298–299.
87. William Whewell, *On the Principles of English University Education* (London: John W. Parker, 1838), p. 176.
88. James F.W. Johnston, 'Meeting of the Cultivators of Natural Science and Medicine at Hamburgh, in September 1830', *Edinburgh Journal of Science* 8 (1830), p. 201.
89. Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 451.

90. Cited in Martin J.S. Rudick, *The Great Devonian Controversy: The Shaping of Scientific Knowledge Among Gentlemanly Specialists* (Chicago: University of Chicago Press, 1988), p. 234.
91. Cited in James A. Secord, *Controversy in Victorian Geology: The Cambrian-Silurian Dispute* (Princeton: Princeton University Press, 1986), p. 17.
92. Johnston, 'Meeting of the Cultivators of Natural Science', p. 210.
93. Leo Braudy, *The Frenzy of Renown: Fame and its History* (New York: Vintage Books, 1997), p. 530.
94. David Knight, 'Romanticism and the Sciences' in Cunningham and Jardine eds., *Romanticism and the Sciences*, p. 15.
95. Andrew Cunningham and Nicholas Jardine, 'Age of Reflexion' in Cunningham and Jardine eds., *Romanticism and the Sciences*, p. 1.
96. Higgins, *Romantic Genius and the Literary Magazine*, p. 3.
97. Braudy, *The Frenzy of Renown*, p. 530.
98. David Swartz, *Culture and Power: The Sociology of Pierre Bourdieu* (Chicago: University of Chicago Press, 2012), p. 226.
99. Fisher, 'In the Present Famine of Anything Substantial', pp. 97–135.
100. Ibid., p. 102.
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116. Golinski, 'Humphry Davy's Sexual Chemistry', p. 20.
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124. John Willis Clark and Thomas McKenny Hughes, *The Life and Letters of the Rev. Adam Sedgwick*, Volume 1 (Cambridge: Cambridge University Press, 1890), p. 516.
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126. Golinski, 'Humphry Davy's Sexual Chemistry', pp. 24–25.
127. Susan David Bernstein, '"Supposed Differences": Lydia Becker and Victorian Women's Participation in the BAAS', in David Clifford, Elizabeth Wadge, Alex Warwick, and Martin Willis eds., *Repositioning Victorian Sciences: Shifting Centres in Nineteenth-Century Scientific Thinking* (London: Anthem, 2006), p. 87.
128. Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 149.
129. See, for example, Helen Shipton's record of a couple kissing at the 1892 Edinburgh meeting. See Helen Shipton, *August Episodes: Studies in Sociability and Science* (London: A.D. Innes, 1893), p. 83.
130. 'The Old Story (Scientific Version)', *Punch* 73 (1 September 1877), p. 95.

CHAPTER 4

‘An Effete World’: Gendered Criticism and the British Association

On the whole, historians have been fairly positive in their estimation of the success of the BAAS in raising the public profile of science over the first two decades of its existence. Although not generally focused on by scholars, the masculine image of men of science was an important part of this profile, and there is little suggestion from historians that the reputation of male scientists sustained any long-term damage in these years. While acknowledging some initial criticism, directed, in particular, at the festival-like atmosphere and expense of BAAS meetings in the early years, from publications like *The Times*, *John Bull* and the Tractarian *British Critic*, most accounts do not dwell in depth on these comments.

A. D. Orange, the historian who has paid most attention to the British Association’s critics, argues that these attacks were confined to the ‘early’ years of its existence and that the official response of the BAAS was robust enough to ‘fix its public image’.[1] He also insisted that there had been little direct confrontation between the Association and its critics.[2] Indeed, in his conclusion, he played down the importance of accusations levelled against the BAAS, insisting that, as a body, it was sufficiently strong to overcome such attacks: ‘But if the thing was too melodramatic and evoked occasional boos from the ecclesiastical gallery’, he writes, ‘overall the play was an absorbing one.’[3] Other historians have placed even less weight on criticism of the Association. In their study of the early years of the BAAS, Morrell and Thackray argued that it functioned primarily as a force for unification and order within the upper ranks of society. ‘The particular genius of the BAAS’, they declared, ‘lay in its ability to serve as an instrument of public

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
DOI 10.1057/978-1-137-31174-0_4

order and social cohesion while at the same time smoothing over the contradictions and internal tensions that characterized the scientific clerisy.'[4] Yet, they claim, its role as 'an instrument of social harmony through which contending interests could be reconciled'[5] went further than this, reaching out beyond the ranks of the elite to embrace the industrial and mercantile classes as well:

> In choosing science—abstract, universal knowledge—as its goal, the Association claimed enviable territory. On that ground leaders of the middling classes from industrial centres could meet the aristocracy and the gentry to make a community. Where it surpassed its fellows was in its ability to foster vertical integration among the better classes while proclaiming its benign, non-political, and non-sectarian commitment to discovered and universal truth.[6]

Indeed, Morrell and Thackray have argued that '[t]he leading scientists of the Association came closer than any other group to fulfilling Coleridge's idea of a clerisy'.[7]

'Davy, the Chemist and Sir Humphry, the Gentleman'

In this chapter, I will argue that, when considered from a gendered point of view, the criticisms made against the BAAS, its masculine model—the gentleman-scientist, and its style of aristocratic sociability, were more significant than such statements imply. Indeed, when placed against the background of more than a century of gendered scepticism towards men of science and the pursuit of natural knowledge as a masculine activity, it is important to recognize these attacks not as new or unprecedented, but rather as the latest incarnation of centuries-old criticism of the man of science, and before him, the natural philosopher and university scholar. In Chapter 2, which focused on the eighteenth and early nineteenth centuries, we analysed two types of gendered criticism directed at men of science; the first focused on the traditional stereotype of the scholar (with which, as Steven Shapin has shown, the figure of the scientist was long associated[8]) as a reclusive, impractical figure, while the second, levelled most frequently at the Royal Society, emphasized the tendency of elite science to degenerate into a foppish dilettantism. Given the sustained attacks on the Royal Society for its aristocratic exclusivity and expensive socializing during the

first two decades of the nineteenth century, we should not perhaps be surprised by the similar criticisms directed against the British Association when it chose to adopt a similar model of aristocratic sociability.

However, a more obvious cautionary tale exists in the figure of Sir Humphry Davy, the man who, perhaps, more than any other acted as a role model for the nascent BAAS. In Chapter 3, we discussed Davy primarily as a positive masculine example, a figure who seemed to represent a stylish, impressive and, above all, worldly model of science, capable of challenging the long-standing association of the male scientist with the effete and reclusive scholar. We should, of course, not forget that Davy was intimately bound up with the Royal Society, being its president for seven years from 1820 until his resignation on the grounds of ill health in 1827. As such, he was also associated with its aristocratic atmosphere and expensive habits of socializing. As Jan Golinski has shown, Davy, like the Royal Society, was criticized throughout his career for his decadent lifestyle, foppish appearance and theatrical, self-aggrandizing style of public speaking.[9] An early criticism, which questioned Davy's manliness, and which was later to form a thorn in the side of the BAAS, was linked to his dependence on aristocratic sponsorship, particularly during the early years of his career when he was lecturing at the Royal Institution. Until he married the rich widow, Jane Apreece, at the age of thirty-five, Davy was not a man of independent fortune and so was required to work for a living. His provincial origins were often highlighted by his critics. One particularly offensive attack from 1824 in the conservative magazine, *John Bull*, claimed that 'the clothes of a gentleman do not sit easily upon him … He smells of the shop completely.'[10]

In attempting to dress elegantly, Davy received little of the credit which attached to fashionably attired gentlemen and aristocrats. While for the nobility and gentry, dressing well served to enhance their masculinity and authority, for Davy it invited gendered accusations of foppishness and dandyism. Just as fops and dandies were attacked for being superficial and false, so Davy was viewed by some, particularly the critics in *John Bull*, as an imposter aping (but not properly filling) the clothes and behaviour of his social superiors, while content to take their money. This, I think, was the conclusion which *John Bull* intended its readers to draw when Davy was placed in its 'Humbugs of the Age' series. Severe critics even suggested that his interest in chemistry was significantly less important to Davy than his dandyish desire to be admired. Referring to his visit to Napoleon's court in 1813–14, when France and Britain were still at

war, *The Examiner* was clear about Davy's motives for the trip: '"[H]e may talk about so many chemical intentions as he pleases"', it declared, '"but he goes to see and to be seen, to be hawked about among coteries and Lyceums, and to have it said, as he moves along through smiles of admiration … Ah, there is the *grand philosophe, Davie*!"' His actions were particularly offensive on this occasion as his behaviour was seen to be not simply unmanly but also unpatriotic. '[T]he consenting to act in this slavish way', the *Examiner* concluded, 'to seek for unnecessary homage in an enemy's court … is in our minds not only un-English conduct, but very unphilosophical, and such as goes hard to establish that charge of foppery which is made against Sir HUMPHREY's character in general.'[11]

Davy's efforts to dress fashionably and his predilection for high society were also ridiculed on the grounds that, as a man of science, he should be pursuing a very different lifestyle, a sober, reclusive life focused on his work. In justifying its attacks on Davy, *John Bull* stated clearly that 'It is not of Davy, the chemist, we are going to speak, but of Sir Humphry, the gentleman. In this latter capacity no humbug *can* be more super-eminent.' Just as *The Times* and *British Critic* would later beg the BAAS to go back to their 'cloisters', so the writer of the *John Bull* article declared his wish that 'Sir Humphry would keep to his crucible, and drop the drawing-room'.[12] At the end of the piece, the writer expressed the hope that the article might bring about a change in Davy's behaviour: 'If he would forswear fine clothes, and fine company; if he would give up the notion of being a clever man in genteel society …; if he would stick to his own particular profession, everybody, would rejoice in his talents, tempered, as they would then be, with modesty.'[13] Prejudice against Davy's lowly origins and his 'profession' as a man of science were joined in the *John Bull* attacks. Fine clothes, fine manners and polite conversation were acceptable, even praiseworthy, among the non-scientific aristocracy; but for Davy, a man of provincial origins and a man of science, to ape their ways was, the magazine argued, 'the *ne plus ultra* of absurdity'.[14] Such comments clearly demonstrate that a significant tension in public understanding between the idea of the scholar and the gentleman persisted well beyond the end of the eighteenth century.

In 1824, at the height of his fame, Davy likewise received little quarter from the more popular press. As an article in *The Chemist* shows, the supporters of the Mechanics Institutes found Davy's gentlemanly style and aristocratic company equally unbecoming. 'The President [of the Royal Society], not contented with being the first chemist of the age,

aims at being a man of ton … He is said to be one of the most exquisite triflers of the day, making quite a figure in the drawing-rooms of *good society*.' They identified their attack on Davy as motivated by their 'wish to reduce aristocracies in science to their proper level'.[15] In a tone which foreshadowed arguments that would be made a few years later against the BAAS, including by some of their own members in the 1840s, the article concluded by stating the view that aristocratic foppery in science was on its way out:

> Fortunately, however; the spirit of the age does not accord with the views of the dandy philosophers; they may black-ball at Somerset House … or shut themselves up in the atheneum; they may drive themselves into a corner, like the exquisites at Almack's; but they will only, like them, have the mortification of seeing that the world goes on better without them.[16]

The reference in this last quotation to 'the exquisites at Almack's' is important for understanding another aspect of the gendered criticism levelled at Humphry Davy and also, later, at the BAAS. Almack's Assembly Rooms in London, which had opened in 1765, was the first aristocratic social club for men and women in Britain, and became the heart of the mixed-sex sociability typical of the metropolis in the later eighteenth century. Here, as in Enlightenment salon culture more generally, women possessed considerable influence, with a number of aristocratic lady patronesses deciding who might and might not gain entry.[17] In the changing atmosphere of early nineteenth-century Britain, however, with its well-studied stiffening of gender boundaries and promotion of the concept of separate spheres for men and women, there was a growing suspicion of Enlightenment models of masculinity. It was precisely this culture of politeness and sensibility, characterized by mixed-sex sociability under female hostesses, fashionable dress and the display of luxury goods which came to be viewed as what historians have termed a 'feminization of manners' undermining masculine authority.[18] As Jan Golinski has shown, in his early career at the Royal Institution, Davy embraced precisely this 'Enlightenment repertoire' of male and female audiences, with his lectures on chemistry often attracting large numbers of fashionable ladies.[19] The presence of these women was what led Brougham, though defending Davy, to label the Royal Institution as 'unmanly' and 'enervating'.[20] In the same way, Davy's (albeit) limited promotion of women as cultivators of science was also seen as unmanning. He visibly enjoyed the attention of his female audiences

and was accused by *The Times* of 'making women and children troublesome by the affectation and babble of knowledge'.[21]

This argument receives strength from the nature of the attacks made against Davy's wife, Jane, in the *John Bull* article of 1824. She was presented as the unnaturally masculine patroness of scientific Enlightenment-style 'coteries of old women, male and female' in her native Edinburgh in the early years of the nineteenth century. To the abhorrence of the author, these gatherings had endeavoured to recreate in 'Auld Reekie' 'the French society of the last century', to 'ape the elegance of Paris in the days of Louis Quinze'. Taking a swing at the famous mathematician John Playfair, who had attended Jane Apreece's scientific soirees in Edinburgh, the magazine declared: 'Because D'Alembert and Maupertuis, and others of that grade, had frequented female society, and been regarded as ornaments at the petits soups of Paris belles, such folks as Playfair thought it would be quite the thing for them also.' After their marriage, this practice of Enlightenment sociability continued with Sir Humphry and Lady Davy regularly playing the aristocratic hosts. So obscenely foppish did *John Bull* consider their behaviour to be that it led, the magazine argued, to a complete reversal of gender roles between them: 'He talks badinage, and follies, and frivolities. She, on the contrary, despises the mere feminine chatter of the day, and discusses topics of literature and science.'[22]

We detect a similar tone in the criticisms made of Davy during his earlier visit to the court of Napoleon, widely considered in Britain to be reviving the worst of the corruption and foppery of *ancien régime* France. We recall that *The Examiner* stressed his chief motive in going was not to pursue chemistry but to 'see and to be seen'. As Thomas Carlyle was to spell out in *Sartor Resartus*, first published in 1833–4, this was the essence of the 'dandy', a figure of compromised masculinity, whose only desire was 'that you recognise his existence'; that you turn upon him 'simply the glance of your eyes … do but look at him, and he is contented'.[23] In this definition of the 'Dandaical body', we find the essence of all the gendered criticism made against Davy years earlier—his overt theatricality in front of audiences largely composed of women, his real motives for visiting Napoleon's court at Paris during the war years, and his embarrassing behaviour in 'fine company'[24] as he tried unsuccessfully to ape the genteel manners of the aristocracy. 'He lounges into a room', we are told, 'with what he thinks is an elegant languor. Then he talks trifles to young ladies, in what he imagines is the delightful tone of easy conversation … The poor fellow fancies himself irresistible among the girls, and is evidently

preening himself, while conversing with them.' In conclusion, the article declares 'this mixture of dandyism and science … to be one of the most disgusting things in the world'.[25]

Although the dandy was not usually interpreted as a homosexual character *per se*, there is some evidence to suggest that this was another accusation made against Davy, in private at least.[26] There was plenty in printed attacks on Davy to suggest that relations with his wife were at best frosty. *John Bull* implies that Davy married for money rather than love and that they often quarrelled in public or more often ignored each other. It refers to Davy's 'indifference' to his wife's charms and that he considered her 'too old' and 'a bore'.[27] A letter written by Davy's friend, Sydney Smith, in 1816 to Lady Holland, seems to hint, through a number of chemical allusions, that he may have been impotent. 'The decomposition of Sir Humphry and Lady Davy is entertaining enough', Smith wrote: 'I wonder what they quarrelled about … Perhaps he vaunted above truth the powers of Chemistry and persuaded her it had secrets which it does not possess, hence her disappointment.'[28] Their childlessness certainly remained a topic of gossip. In his 1831 biography of Davy, the physician John Ayrton Paris recalled the chemist's 'frigid indifference' to the famous artworks on display at the Louvre during his visit to Paris including the Venus de Medicis. His 'apathy' and 'total want of feeling' are denounced by his biographer as 'inexplicable' and against 'the order of nature'. The only piece to attract Davy's admiration was a statue of Antinous, the young lover of the Roman emperor Hadrian. 'What a strange—what a discordant anomaly in the construction of the human mind do these anecdotes unfold!', Paris declared in concluding his discussion of events at the Louvre.[29]

Golinski, however, suggests that Davy represents the end of this aristocratic style of science, characterized by an Enlightenment atmosphere of mixed-sex sociability and female audiences. 'In the decades following Davy's career', he writes,

> the alternative model gained ground among the leading men of science … The masculine scientific identity was seen to be bound up with the exclusion of women from any significant participation in the institutions of science, and their restriction to a very marginal position among its audience. Male scientists would henceforth seek to establish the potency of their instruments and the authority of their methods in exclusively male circles, confining women to attendance at occasions of popularization or to the role of domestic support.[30]

Likewise, he views the establishment of the BAAS as part of the shift towards a formal exclusion of women from science. He cites as evidence to support his statement the famous remarks of Buckland at the Oxford meeting of 1832 that he wished to ban women from the sections lest they turn into 'a sort of Albemarle-dilletanti-meeting, instead of a serious philosophical union of working men'. Buckland was likely referring here to lectures like Davy's at the Royal Institution which was located on Albemarle Street.[31] While Buckland may have been reflecting the development of a broader social critique of Enlightenment science, which we have already considered, his was not, as yet, the prevailing view among men of science themselves. As we saw in Chapter 3, the BAAS was characterized from its inception by aristocratic patronage and mixed-sex sociability which included women attending evening scientific lectures and increasingly also sectional discussions.[32] This was, moreover, due in no small part to Davy's example which they valued, in many ways, as a role model for their new ideal of the gentleman-scientist. Buckland's comments are more accurately interpreted as the exception proving the rule; for he was actually responding to the increasing prevalence of women in the sections.

'Mingling Together Things in Their Nature So Incongruous'

When we examine the criticism directed at the BAAS in its early years, we find many themes in common with the attacks made upon Davy a decade or so before. Above all, we see critiques of the Association's desire for aristocratic approval and sponsorship and the effects which this was believed to have upon the atmosphere of meetings.[33] Most vocal here, perhaps, were attacks published in the conservative journal and mouthpiece for the Anglo-Catholic Tractarian movement, the *British Critic*. In an article that appeared in January 1839, John Bowden, a close friend of John Henry Newman, argued that by courting aristocratic society, men of science were embarrassing themselves and spurning the traditional role of the scholar. Before they joined together to form the Association, he wrote, they were nothing more than

> a group of individuals … personally undistinguished and unregarded by the million that moved around them … No public honours testified the estimation in which they were held by an admiring multitude—no civic or county

> feasts … no aristocratic attentions … were likely to be showered upon them in their corporate or philosophic character.[34]

The change wrought in just a few short years was astonishing, remarked Bowden, who recognized, perhaps more than any other contemporary commentator, the importance placed by the BAAS in changing completely the public perception of the man of science. 'But when once upon their travels', he wrote, 'the scene … was wonderfully and, as philosophers are men, most agreeably changed.' 'The appearance of the associators', as he termed them,

> has been the signal for an influx into each town of the greater portion of the rank, fashion, and elegance of its neighbourhood. In the intervals of the staple business of their meeting, they have been invited to promenades, fancy fairs, or horticultural exhibitions, or dazzled by fireworks kindled in their honour.[35]

With strong echoes of the attacks against Humphry Davy, in particular, those made by *John Bull*, Bowden condemned roundly 'this mixture of philosophy and pleasure, of scientific research and fashionable amusement … the dry essays and reports of science with the flowery and overly complimentary eloquence of after-dinner toast-speeches'. The chief consequence of 'mingling together things in their nature so incongruous', he declared, was to cause members of the BAAS to appear, not as 'grave' men of science, but as effeminate dandies and fops, aping aristocratic culture. He lamented the disappearance of the 'solitary student', claiming '[P]hilosophers now, as though by natural instinct, club and combine, discuss together, and dine together'.[36] BAAS meetings were not occasions for serious scientific work, but rather opportunities for those he termed the 'gentleman-like', 'dilettanti' and 'loungers' to vaunt themselves and replace true science with the 'vapid nothingness of what is called fashionable life'.[37]

Founding members of the BAAS had themselves expressed the view that they wished annual meetings to have 'the appearance of a scientific fair', rather than 'a grave, formal, dull assembly of learned men'.[38] Such an attitude, however, Bowden argued, imported 'a scenic, or the word may be allowed, an exhibitional character to the proceedings in general … the great point was unquestionably to see, or to be seen'.[39] This was, we remember, precisely the charge levelled against Davy by *The Times*

and *The Examiner* when he visited Napoleon's court in Paris in 1813–14. What made the BAAS seem most ridiculous to Bowden was that they appeared not simply to imitate, but rather to seek to outdo the aristocracy in their finery and genteel manners. 'The flowery compliments bandied from philosopher to philosopher' at previous meetings were enough to have 'exhausted the polite vocabulary', he told readers.[40]

The same year in which Bowden's article appeared, another conservative churchman, William Cockburn, Dean of York and a committed scriptural geologist, claimed that the majority of men of science attended BAAS meetings 'only with the hope of sharing the compliments and the custards which will be lavishly distributed'.[41] *The Times* too adopted a religious angle from which to condemn the Association. Making use of the strong contemporary association between Catholicism and effeminacy, it declared, 'The British Association … is the Catholicism of modern science.' Both were characterized, it argued, by an obsession with 'outward ceremonies and forms, accompanied by no trivial degree of degrading sensual indulgence'. This indulgence was once more linked to an inappropriate aping of aristocratic habits. Referring to their extravagant banquets, the article denounced the BAAS as the 'learned gastronomicals'. The implication of effeminacy was intensified by linking Association members with Oriental opium addicts: they 'are chiefly known', *The Times* argued, 'by that pale abstracted look which omelets and opium frequently substitute for a healthy and vigorous intelligence'. They were likewise described as suffering from a 'serious addictedness to pleasure'. Lampooning the decadent sociability of annual meetings, *The Times* writer depicted the BAAS president and general council as an imposter king with his sham court: 'The retinue of his Unfathomableness and their Deepnesses must be accommodated' at all costs, he declared.[42]

As part of their attacks, these writers argued that the traditional image of the reclusive scholar was the appropriate one for men of science. Referring to the 'defunct' 'gentlemen philosophers' of the BAAS, *The Times* declared, 'We would afford them no shelter or asylum, but would at once drive them back to the places whence they came. "Away with you; betake yourselves to your academic bowers and cloisters, to your studies and laboratories; and there, if you are able, become known to us by your labours!"' What was generally viewed as the inappropriate crossing of a cultural boundary between the two worlds of aristocratic sociability and retiring scholarship is here figured in physical and spatial terms, with a call for men of science literally to return to their 'cloisters' and 'laboratories'.

Their claim to the celebrity and cultural authority attaching to the wealthy and well-to-do, embodied in the sociability of BAAS gatherings, is firmly rejected. 'What are your persons to us, your limbs and lineaments?', *The Times* asks: 'We wish not to see how you eat and drink, and speak, and sport … Come not to waste your time and ours.'[43] In this construction, the British Association scientists are figured as so many unwelcome intruders, even invaders, into aristocratic and fashionable life. The demand is for nothing less than that they re-conform to the old model of scholarship and scientific research and return to their hidden, isolated lives away from society's gaze.

The implications of this attitude for the masculinity of men of science are significant. It would not be accurate to speak in terms of two contrasting, even opposing, masculine ideals; rather, the scholar is denied any claim to masculinity at all. The very traits which mark the masculine status of the gentleman—his physical appearance—his 'limbs and lineaments'—are denied to the scientist. In line with the traditional understanding of the scholar as effete and reclusive, the man of science is imagined almost as disembodied. As the Romanticism of the early nineteenth century made room for the sterner morality of the early Victorian period, we see solitude itself and those figures characterized by it, chiefly poets and writers, but also scholars and scientists, depicted not only as effeminate but as lacking in the physicality and corporeality necessary for masculinity.[44] In his poem recounting the suicide of the Greek philosopher, Empedocles, Matthew Arnold, who was himself the victim of accusations of effeminacy related to his desire for solitude, caught this contemporary view of the scholar and man of science well.[45] Just before he jumps into the crater of Mount Etna, Arnold has Empedocles say to himself: 'But no, this heart will glow no more; thou art a living man no more, Empedocles! Nothing but a devouring flame of thought—But a naked, eternally restless mind!'[46]

Indeed, a fevered state of mind and nervous excitement, traits frequently connected with the feminine character, were repeatedly associated with BAAS gatherings in the 1830s and early 1840s. John Bowden in the *British Critic* had highlighted this aspect of annual meetings in particular and linked it with the artificial, theatrical atmosphere which characterized the events for the Association's critics. '[A]n assembly, crowded and excited, and congregated under the amusing and exhilarating circumstances which accompany the meetings', he declared, '… comes together ready prepared for striking scenes and coups de theatre, and the transactions carried on in its presence will, from this cause alone, often tend to

assume the character of sudden transition, of overwrought emotion, of exaggeration.'[47]

This charge was, to some extent, validated by BAAS members themselves. Founding member John Robison went so far as to identify a specific condition, which he termed 'Association fever', which he identified with the stress of attending annual meetings. It was brought on, he told his friend, the geologist, John Phillips, in October 1834, by 'the excitement of over-exertion incident to the present mode of proceeding in the Meetings of our overgrown body'.[48] 'The exertion of both body and mind', he declared, '… required to sustain the state of permanent activity during 12 hours per diem throughout a week, is too great even for those who float on the surface, and to the office bearers … is overwhelming.' In his own case, Phillips described the effects as 'paralysing'.[49] Nor did the situation ease in subsequent years. To William Currie, one of the local secretaries for the Liverpool meeting in 1837, Phillips wrote that he

> was obliged to leave Liverpool at great haste, for the excitement of the Meeting had such an effect on me that I could not have borne *5 minutes conversation* as to its success or arrangements, and it was only by boating on Coniston Water, climbing the Old Man [of Coniston] and beating stones like a mason for a month that I got over my horreur d'assemblie.[50]

Another instance of the severe mental and emotional strain which BAAS meetings were believed to produce in those who attended them is found in a letter written by the chemist, William Charles Henry to William Vernon Harcourt shortly after the 1836 meeting at Bristol. He attributed the recent suicide of his father William Henry, also a chemist, to the stress of attending the BAAS meeting:

> I cannot but regard the constant intellectual excitement of the Bristol meeting, operating on too sensitive a frame … as the cause of that sudden delirious paroxysm, which overloaded my poor father's clear intelligence and high moral principle and during a moment of fevered agony subdued his habitual and vigilant self-control.[51]

In his article for the *British Critic*, Bowden went into considerable detail when outlining the possible psychological effects of taking part in a BAAS meeting. His account of the ways in which he believed the identity and behaviour of individual men of science altered during the week-long

gatherings reveals marked similarities with Carlyle's description of the dandy in *Sartor Resartus*:

> Nor could … the most retiring, the most unobtrusive philosopher find himself in the midst of such an excited circle, without being forced into … a consciousness of the display he was making, without feeling that … he was one of the observed, a 'cynosure of neighbouring eyes'; or without demeaning himself therefore to some extent as an actor.[52]

The 'actor' comparison is worth focusing on. It is a recurring feature of criticism of the BAAS in the 1830s just as it had been in the attacks made against Davy earlier in the century. It was connected with contemporary notions of effeminacy in a number of ways.

Firstly, the figure of the actor held strong connotations of dependence—most obviously, of financial dependence. Actors were frequently viewed in the early nineteenth century, as they had been from ancient times, as lacking the independence necessary for masculinity. This was chiefly because they were considered to sell their bodies (in a manner often likened to prostitution) for money.[53] This image was particularly used to describe those men of science who allied themselves with Napoleon—and we remember the storm of protest occasioned by Davy's visit to the French Emperor's court in 1813–14. Over fifteen years later, in 1830, when Babbage praised Napoleon's patronage of science and recommended greater state honours for scientists in Britain, the Dutch astronomer Gerrit Moll denounced his views, claiming that such a policy would rob men of science of their masculine independence. 'Does Mr Babbage imagine', he wrote,

> that Dr Wollaston, or Dr Maskeline … would have been more respected either at home, or abroad if … they had a dozen different ribbons pending on [their] breast? … Such crosses and badges are but too often the price for which honour and conscience are bought. These gaudy baubles are the hooks and baits by which a prey may be allured, which could not be taken in any other way.[54]

Augustus Bozzi Granville had launched similar attacks against David Brewster for seeming to measure scientific masculinity in terms of 'how many crosses and yards of variegated ribbon' individuals had received or 'what lucrative situations they have filled—without even hinting at the nature of the talent, invention, discovery, or scientific acquirement, for which these puerile, gewgaw-distinctions were granted'.[55] Such trifles

were damaging to the masculine autonomy of men of science, he argued, reducing them to a 'puerile' dependence upon the state. Men of science should be known only by 'the weight of that name which would inevitably suggest itself' from the value of their discoveries and inventions. '[A]ll the crosses and medals and pretty worded letters from home and foreign ministers, or even a gazetted monosyllable prefixed to the inventor's name' are as nothing compared with this.[56]

The term 'actor' suggested, in addition, another, potentially worse, sense of dependence; actors were often criticized as lacking in manly self-control, suffering from an addiction to self-display, seeking psychological and emotional fulfilment from the praise of others. Many critics of the BAAS drew a direct comparison between the leading members of the Association and professional performers. Thus, *John Bull* represented the BAAS visitors to the Dublin meeting in 1835 as 'so many dancers in caps and bells'.[57] In his 1838 *Remonstrance* to the incoming BAAS president, the Duke of Northumberland, Dean Cockburn referred to Association meetings as 'assemblies of Thespian orators' and implored the Duke to ensure that Newcastle would be 'the *last* theatre' for these scientific performances.[58] *The Times* too criticized early BAAS meetings for abandoning 'profound studies' in favour of 'superficial acquirements which command immediate applause'.[59] For a few critics, this sort of behaviour was not only unmanning for male scientists, but also dehumanizing. Indeed, in late August 1836, the *Literary Gazette* likened the leading members of the BAAS to the managers of a circus and the most prominent scientists to circus animals:

> [L]ike Cross or Pidcock's menageries, after exhibiting during the winter in town, they have despatched the leading animals into the country, there to be shown for public amusement and instruction. We rejoice to observe that the Caravans now at Bristol promise fairly in both respects; and, provided the turtle and other feeding be satisfactory, we have no doubt they will perform even more than the promise.[60]

One of the most frequent complaints about the theatrical style of BAAS meetings made by the Association's religious critics was the tendency it had towards self-aggrandizement and a foppish sense of pride in one's ability to delight others. For the Tractarian Bowden, as well as for other churchmen writing against the BAAS, this constituted the opposite of true manliness, which was to be found in a proper sense of humility, modelled

on the example of Christ himself.[61] In particular, Bowden objected to 'what theatrical people call the "starring" system—the system, that is of puffing off the most promising members of their company as prodigies, and living, as it were among wonders'.[62] As we have seen, this sort of distinction was implicit within the Baconian framework adapted by the founders of the BAAS, which raised the most talented and insightful, the 'lamps' or 'lights', above the rest.[63] Bowden cited as a particularly repugnant example of this, the description by Adam Sedgwick of the recent electrical experiments conducted by Andrew Crosse and communicated to the BAAS at the 1836 meeting in Bristol. 'Professor Sedgwick eulogized the experimentalist', he complained, as one who had 'been carrying on the most gigantic experiments, attaching voltaic lines to the trees of the forest, and conducting through them streams of lightning as large as the mast of a 74 gun-ship, and even turning them through his house with the dexterity of an able charioteer'.[64] Such praise, to Bowden's mind, raised Crosse almost to a level with God himself and reminds us of the similar claims made by Davy over thirty years earlier, to 'interrogate nature with power'.[65]

Religious critics argued that such pride and self-display even contravened contemporary standards of gentlemanly behaviour, apparently so important to the BAAS. As William Cockburn complained, 'the lecturers will arrive at Newcastle, booted and spurred … and each in succession communicate, with breathless haste, some recondite and startling conclusion, intended primarily to make the hearers stare.'[66] This aggressive and competitive style was viewed by many as the polar opposite of how an English gentleman ought to behave. In an 1835 article for the *Quarterly Review*, the Scottish man of letters John Gibson Lockhart lambasted the 'gastro-patetics who are pleased to call themselves the British Association'.[67] The self-display of these 'performers' is contrasted with the image of the true gentleman who gallantly holds himself back in polite society, seeking to ensure 'the general happiness of a party', taking care to give 'every individual an equal chance, and … wounding no one's self-love'. What is called an 'overpowering person', we are told, 'is immediately shunned, for he talks too much, and excites too much attention'.[68]

Such character traits were likewise key to contemporary understandings of the dandy as explained by Carlyle. Both the dandy and the actor were seen as dishonest and false, pretending in public to be someone or something other than they really were. As we have seen, both Davy and the leading members of the BAAS in its early years were judged by their

critics to be dishonestly aping aristocratic manners and lifestyle. The association of 'actor' with dishonesty made the label especially distasteful at a time when integrity and sincerity were becoming increasingly important hallmarks of masculinity. We see this clearly in Thomas Carlyle's *On Heroes, Hero-Worship and the Heroic in History*, a series of lectures first delivered in May 1840 and published later the same year.[69] With the rise of increasingly religious notions of manliness—first under the influence of evangelicalism and later Tractarianism (as demonstrated here by Bowden in the *British Critic*)—humility was described as a key trait of the masculine character.[70]

These developments all form part of the growing critique of Enlightenment culture which we referred to earlier. No contemporary commentator captured this better than Carlyle in his self-constructed role as prophet, preaching to his generation on the sins of the age. For Carlyle, inspired by German idealist philosophy, the eighteenth century had been an 'effete world',[71] an age of gentlemen, inspired by French culture with its 'unhealthy … sensuality'.[72] During this time, he wrote, 'the mass of men … live[d] merely … among the superficialities, practicalities and shows of the world'.[73] It was a time when real masculinity was impossible. 'Perhaps in few centuries that one could specify since the world began, was a life of Heroism more difficult for a man. The very possibility of Heroism had been, as it were, formally abnegated in the minds of all', he declared. 'Heroism was gone forever; Triviality, Formulism and Commonplace were come forever.'[74]

The dissimulations of those who gave themselves out as 'men of science' were, for Carlyle, symbolic of the sham and effeminacy of the eighteenth century. '[W]hat Century', he asked, 'since the end of the Roman world, which also was a time of scepticism, simulacra and universal decadence, so abounds with Quacks as that Eighteenth?' 'Consider them', he wrote, 'with their tumid sentimental vapouring.'[75] In his own day, despite his familiarity with some of its founding members,[76] the BAAS were, for Carlyle, representatives of the same dandiacal dishonesty. In a letter to his wife, dated 7 September 1837, he referred to the Association preparing to meet in Liverpool, as the 'Scientific humbugs'. He travelled to Liverpool to pick up his mother and at the suggestion of his wife's uncle that he should remain to witness the BAAS gathering, declared that he wished to avoid it at all costs. 'My own feeling', he wrote, 'would lead me to rush directly from the Steamboat to the Railway, and having set my Mother down at Manchester to start next morning for London all at a stretch.'[77]

'The Grave Ascent of Science and the Soft Sanction of Beauty'

As we saw in Chapter 3, the mixed-sex sociability of the BAAS was a key feature of the aristocratic atmosphere its leading members sought to cultivate. It likewise played a prominent part in criticisms directed against the body in its early years. Bowden, in particular, castigated the flirtatious interactions between the men of science and their female audience members during evening lectures. He cited, disapprovingly, the comments of Lord Morpeth made at York, that the Association's resolutions were passed 'with the grave assent of science and the soft sanction of beauty'. Likewise, the claim of the Marquess of Northampton, president in 1837, that 'fair eyes were the harbingers of fair deeds'. '[W]e certainly doubt', declared Bowden, 'whether philosophers, at the moment in which this truth is forced on their conviction by a galaxy of such eyes beaming from every side of the gallery … are under circumstances peculiarly favourable to that grave discipline on subjects of an abstruse nature, which they … have measured many a weary mile to enjoy.' He similarly condemned the practice of organizing 'promenades' during meetings for the explicit purpose of allowing 'those ladies who had not been so fortunate as to obtain tickets … an opportunity of seeing the lions'. He feared, above all, the 'effect on the lions themselves' and on their subsequent ability to pursue 'the proper occupations of their leonine character'.[78]

We have already discussed Bowden's view that the theatricality of BAAS meetings demeaned individual scientists by subjecting them to the gaze of their peers and the wider public and tempting them to indulge in arrogant display. The effect was doubly unmanning, however, when it was a female gaze to which men of science were exposed. It seemed to invert the proper relationship between the sexes, giving an unwarranted and voyeuristic power to the female audience. While the participation of women had been a hallmark of eighteenth-century polite society, during the early years of BAAS meetings, critics of the Association portrayed the presence of ladies rather as an unwanted hindrance to the proper prosecution of masculine science. After the second meeting in Oxford in 1832, *The Times* complained that by constructing an ostensibly scientific gathering primarily for 'the amusement of ladies and children' the organizers were 'degrading the dignity of science, by a mere unexplained display of philosophical toys'.[79] At the Newcastle meeting in 1838, *The Morning Post*'s correspondent complained of the 'everlasting shuffle, scrape, scratch and shifting of

the promenade of ladies on the bare boards—some tripping upstairs in reckless haste to indulge their curiosity, and disturbing row upon row of real listeners'.[80] These comments spoke to the fear expressed by Buckland himself at the 1832 Oxford gathering, that BAAS meetings would come to resemble Royal Institution lectures with their popular atmosphere and largely female audiences. A member of the organizing committee for the Newcastle meeting in 1838 expressed concern that the previous year in Bristol the ladies attending were primarily 'the wives and daughters of wealthy merchants and tradesmen, who had never looked into the title page of a book of science, who could not tell you the difference between *geo*logy and *genea*logy; or *ast*ronomy and *gast*ronomy'. He went on to ask his fellow committee members, 'Are there 500 ladies living in Newcastle, who can enter with zest into the *scientific* portion of the week's proceedings? I boldly affirm that there are not.'[81]

Foppish self-display was not the only temptation, however, to which, religious critics of the BAAS feared men of science might be subject during annual meetings. Bowden, in particular, complained about what he considered the unrivalled potential for illicit romantic relationships and sexual encounters. We remember from Chapter 3 that annual meetings were treated to some extent as marriage markets with men of science deliberately bringing their unmarried daughters to search for an appropriate future spouse.[82] Bowden goes so far as to speak of the potential for 'moral abasement' which accompanied the annual BAAS gatherings.[83] We have already seen him link these occasions with the use of opium.[84] The men and women attending, he complained, 'were brought into close and uninterrupted contiguity from morning to night. The principle, in short, of the meeting, was to combine in everything—but Christian prayer and praise.' He writes of male and female visitors forming 'with each other … the closest bonds of amity, and … of habitual intercourse'.[85] The most notorious sexual scandal involving a prominent gentleman-scientist and BAAS member did not, however, take place during an annual meeting. Dionysius Lardner, a popular scientific lecturer, who spoke to rapt audiences on steam engines and Babbage's Difference Engine at BAAS meetings illicitly eloped with Mary Spicer Heaviside, the wife of Captain Richard Heaviside of the Dragoon Guards (and mother of his three children) in the spring of 1840.[86] A reading of the reaction of the popular press to the scandal tells us much about how the masculinity of men of science was perceived at this time, particularly, the new type of gentleman-scientist pioneered by the BAAS in the first years of its existence.

Lardner represented, in many ways, the ideal combination of science and society which the Association was seeking to promote. He was a great admirer of Humphry Davy, a popular lecturer on the London circuit who sought out the company of aristocrats, and revelled in the attentions of ladies. Although any illicit affair, particularly an adulterous one, received its fair share of opprobrium in the 1830s and 1840s, the comments made about Lardner are worth dwelling on. Although morally wrong, his seduction of a well-to-do married woman might well have been seen as symptomatic of an excess of sexual appetite in a foppish man of fashion, lamentable, perhaps, but to be expected. It was, however, most definitely not to be expected of a man of fashion who also gave himself out as a man of science. Here, once again, we see the gaping cultural divide persisting, despite the efforts of the BAAS, between popular understandings of the scholar and the gentleman. Lardner's crime was viewed as far worse because as a 'grave' man of science, traditionally linked with the asexual figure of the reclusive scholar, he was simply not supposed to behave in this way. His very name, Dionysius, the famous Greek God of wine and song, might have been a fitting name for a fine gentleman, but not for a sedate man of science. Instead, he is ridiculed as 'Dennis'[87] or even 'DIDDEROO DINNISH'.[88] We discussed earlier the possibility that the scientist was viewed not so much as effeminate as being without masculinity at all—a disembodied mind. Similar assumptions were at play here in the reaction to Lardner and Mrs Heaviside's elopement. After lamenting the fact that his scientific reputation gave him a 'passport into Society',[89] *The Morning Post* presented him not simply as breaking up a happy home, but as threatening to invert the entire gender order of England, bringing all married women under suspicion:

> The conduct of this creature to the woman whom he had torn from her home and children was cruel and unmanly; but to the married females of England it has been base beyond description. He has attempted to poison all the domestic charities by holding up our wives to suspicion, and the mothers of our children to doubt.[90]

Lardner was portrayed, as Davy had been, as a dishonest imposter, playing the fine gentleman, while in reality following his own base motives. On the one hand, he was lampooned as unmanly and effeminate for this. Most contemporary articles contrasted him unfavourably with his lover's husband, Captain Heaviside. Lardner was depicted as ugly and

short compared with the virile military officer and true English gentleman, well-born and wealthy.[91] Likewise, in character: while Heaviside was described as straightforward, honourable and brave, rushing to Paris with his father-in-law to confront his wife's lover and give him a good thrashing, Lardner, by comparison, showed an 'instinctive dread of danger'[92] and was described as a 'recreant [cowardly] philosopher' who cowered under a piano to escape his attacker.[93] Moreover, it was strongly implied that he could not attract a woman in the normal way. Though standing high 'in the school of science', he was considered quite wholly to lack those 'personal qualifications which … dazzle and win the favours of the gentle sex'. Indeed, it was widely claimed that he had used 'drugs', 'animal magnetism' or some 'mesmerian' technique to gain control over his 'victim'.[94] Here, once again, we see similarities to the representation of Davy's relationship with his wife in the popular press.[95] Crucially, it was Lardner's status as a scientist which was made central to the charge that he had somehow duped Mrs Heaviside into eloping with him. It was repeatedly claimed that he abused his 'scientific knowledge' to commit his crime.[96] The underlying assumption was that a mere man of science, a 'Professor' as he is often referred to in popular accounts of the affair,[97] was not a sexually capable, fully masculine man, having to rely instead on 'dark and invidious arts' to seduce women.[98]

Yet Lardner was not simply depicted as effeminate in terms of lacking 'normal' masculine traits, both physical and mental; he was also portrayed as unnatural and inhuman. One article from *The Age* published in August 1840 described his 'peculiar vileness', 'beastly depravity' and 'cold-blooded, unfeeling barbarity'.[99] Elsewhere, he was denounced as a 'calculating … mechanical philosopher'[100] who seduced Mrs Heaviside, not from 'any headstrong feeling, or any impulse of passion' which might, however morally inappropriate, offer a partial excuse for his conduct in a normal man, but for 'base and filthy lucre'.[101] He is described as 'sinister', 'serpent-like'[102] and is repeatedly called a 'creature'—to be reviled by 'all who are deserving of the name of man'.[103] Once again, we are confronted with revulsion at the seeming dishonesty and insincerity of the man of science who is aping the habits of the fine gentleman merely to ingratiate himself with a rich lady—a man who is shamelessly mixing two completely separate understandings of what a man should be. For Charles Dickens, he was 'the prince of humbugs'.[104]

Although the elopement was not associated with an annual meeting *per se*, the reputation of the BAAS was directly affected by the incident

as Lardner was one of their most prominent and popular members in 1840. It was also precisely the sort of publicity they did not want at a time when they were increasingly criticized for the foppish and extravagant atmosphere of their annual gatherings. In the wake of Captain Heaviside publicly suing Lardner for damages, they officially let it be known that Lardner would 'be removed immediately from the council of the British Association, on account of the recent disgusting disclosures on the trial against him at the suit of Captain Heaviside'.[105] Satirical accounts of the elopement, however, reveal more about how the revelations about Lardner harmed the public reputation of the BAAS. One article from September 1840 referred to Lardner 'being kicked out of the British Association', 'that … body feeling itself much insulted by the terrible lapse from virtue exhibited by the Dr. since the last meeting'. Both the BAAS and Lardner were the targets of the writer's satire in this article, and he was clear to implicate the Association in Lardner's actions. It is not the actions of one man which appear depraved but the whole world of gentlemanly science of which he was a part. 'His being a *scientific* seducer only renders him the more dangerous', the article declared. 'We should think the Dr.'s depravity would form a good subject for discussion in one of the sections, and submit the hint with due deference to the council accordingly.'[106]

Internal Criticism of the Gentleman-Scientist

As the reaction of the BAAS to the Lardner affair suggests, the Association was itself growing increasingly sensitive to the gendered criticism it was receiving and the ways in which its annual meetings were viewed. As early as April 1832, Babbage raised concerns about the prominence of aristocrats in the affairs of the Association, in particular the potential election of the Duke of Sussex to the presidency at the Oxford meeting. Writing to Charles Daubeny on 28 April, he condemned 'persons who pay undue deference to rank' and warned that their collective project risked failure if any 'indiscreet fool or flatterer' were to bring the Duke 'prominently forward in the shape of President, patron or any form for our British Association'.[107] We remember that the election of the Duke to the chair of the Royal Society two years earlier in 1830 (when John Herschel's name had been proposed as a man of science) had revealed deep tensions within the older scientific body about the role and prominence of aristocrats within its ranks. Indeed, Babbage had expressed concern about potential aristocratic interference in science in the same year as he published

his *Decline*. While discussing the German precursor to the BAAS, the Gesellschaft Deutscher Naturforscher und Ärzte, he wrote that 'it speedily became distinguished, not by its publications or discoveries, but by the number of princes enrolled in the lists'.[108]

Reporting on the first ever BAAS meeting in York in 1831, the agricultural chemist, James F. W. Johnston, seemed to anticipate subsequent criticism of the Association when he described the gathering as 'so showy and glittering that a stranger might have thought men had here met together to turn philosophy into a sport, rather than to cultivate "science in earnest"'. 'Ladies and gentleman' assembled 'with equal zeal', he noted.[109] From the very start, there were dissenting voices within the BAAS, arguing against such a prominent role for aristocrats, lavish entertainment and the participation of women. Buckland's comments on women attending the scientific parts of meetings at Oxford in 1832 have already been mentioned.[110] As we have seen, Babbage was an especially prominent critic in the early years. Far from seeking to promote aristocratic science which, he argued, had corrupted the Royal Society, he desired a thorough reorganization of science along collective lines, to replace a dependence on individual genius with an efficient, mechanized system of knowledge production which would guarantee the reliability and, as far as possible, the objectivity, of observations and results.[111] In *Decline*, he noted shrewdly that 'the character of an observer, as of a woman, if doubted, is destroyed'.[112] This was what he believed had gone wrong with the individualistic, disorganized and aristocratic Royal Society. Its character as a scientific body had fallen into doubt and its reputation badly damaged as a result. A new body with a new approach was needed and he placed his hopes in the British Association. James Secord has recently summed up Babbage's vision of a truly objective science as one which '[f]reed of human subjectivity and foibles' would render 'the pursuit of knowledge … manly and secure'.[113] As it became clear, however, that the BAAS had decided to court aristocratic patronage and sociability, Babbage fell out with its leading members and eventually severed all ties in 1838.

As *The Times*, *John Bull* and other publications began printing critical accounts of BAAS meetings, particularly focusing on the foppish atmosphere and extravagant dinners, leading members of the Association began to raise concerns about their negative public image. On 20 January 1834, John Robison wrote to Murchison, complaining that '[t]here was a good deal of joking in various journals last year, on the proportion which the time which was spent in lauding the Association and in interchange of

compliments, bore to the time employed in business'.[114] Later that year, in the aftermath of the meeting at Edinburgh and amid undiminished public attacks, Robison corresponded, this time with John Phillips, about his concern that the 'scramble for ladies' tickets' at Edinburgh and the resulting 'influx' of women might 'occasion either embarrassment or discontent'.[115] In a letter, once again to Phillips, written a year later in 1835, following the Dublin meeting, Robison provides the most detailed account yet of the anxiety which public criticism (both at home and abroad) was causing leading members of the BAAS:

> I am sorry to say that … [e]very one I hear speak of it asks 'if this struggle for pre-eminence in feasting the Association is to continue, what will be the consequences?' and it is said that either the philosophers will be put hors de combat by indigestion, or more probably that few towns will be found willing to receive such pampered guests … Seriously speaking there appears to be a certain taint of ridicule beginning to be attached to the proceedings in the eye of the public not only in this country, but on the continent, and the letters I get from Paris contain many sly jokes about the speeches and the gourmandize so *vauntingly* displayed at Dublin.[116]

He recommended that swift action be taken to protect 'the scientific fame of the Association'. In particular, he prescribed a return to scholarly sobriety and plain diet for the next meeting in 1836. 'It may be well', he declared, if at Bristol 'a rigid physician preside at their banquets to inculcate moderation'. He hoped thereby 'to put matters on a more wholesome footing and to get the feeding department reduced to its proper subordinate level'. '[T]his and a cutting out of all occasions for oratorical display', he cautioned, 'are I suspect essential to the future health & *respectability* of the body.'[117]

Although arrangements seem to have been similarly lavish at Bristol, by the time of the Liverpool meeting in 1837 the Association was actively endeavouring to prevent negative press reporting. Writing to Harcourt after the conclusion of the meeting, Murchison described how, at the beginning of the week, a certain Dr Bryce had delivered a colossal bust of the ancient Roman aristocrat and patron of the arts, Maecenas. The bust was a gift to the BAAS from an Italian physician, Dr Manni, of Rome, as thanks for the kind reception he had received in Bristol the previous year. Murchison told Harcourt how many Association members desired 'that all our affairs on Monday … begin with an exposition of this head in our great amphitheatres, where it was to be served up with a sauce

of Dr Bryce's preparation'. 'I smashed the dish', he declared, deciding to postpone any display of the bust until the Saturday night, 'for I saw that it would be a delightful "morceau" for John Bull and all our friends gastropatetic'.[118] From this we can see that Murchison and other leading members of the BAAS were trying to anticipate events which might provoke accusations of effeminacy, foppery or decadence in the popular press. Indeed, following the Glasgow meeting in 1840 which managed, once again, to attract hefty criticism for the extravagance and luxury of its arrangements, the Association decided to establish formal rules about how much could be spent by local committees, particularly on entertainments and social activities. Writing to Whewell, Murchison declared:

> … they saddled the town with £800!!! For three nights of a theatre!! I *expostulated* but was too late. We have now resolved to draw out a code of instructions for *locals* and for future regulations to be observed at all our meetings by which the British Association shall *insist* on no such expenses and displays.[119]

Likewise, from 1837 onwards, following particularly vicious attacks in *The Times* and *John Bull*, opposition grew within the BAAS to the now customary policy of aristocratic patronage. Immediately following the Liverpool meeting in September 1837, Murchison wrote to Harcourt, informing him of a significant change of feeling among leading members of the Association: 'I must tell you by way of interlude that Lubbock broached as a principle … that we ought always, if possible, to take a scientific chief.' He told Harcourt, moreover, that he 'cheered the sentiment (warmly) and stated that it was our wish to act on it from time to time whenever a favourable opportunity occurred'.[120] With a similar interest in safeguarding the 'scientific' reputation of the Association, Philips wrote to Harcourt in late August 1837, imploring him not to resign as general secretary. He feared that, if Harcourt's powers reverted to the council, the role of aristocratic influence would increase: 'There *station*, rank et id genus omne, will stifle your simple flower of philosophy, or turn it into a double and fruitless gewgaw.'[121] Almost a year later, in early August 1838, Harcourt himself was urging Murchison to propose 'distinguished men of science' as president and vice-presidents for the next meeting in light of the 'cry of too much aristocratic learning which has begun to prevail'.[122]

This sentiment continued to grow in strength into the early 1840s. In September 1840, Charles Lyell, the geologist, wrote to the mathematician

William Whewell informing him of his nomination for the BAAS presidency in the following year.[123] Whewell himself had been most reluctant to be put forward for the role, on the grounds that he was not a man of sufficiently high social rank and influence. 'It could only produce failure and ridicule', he wrote to Murchison, 'to have me put in a place which should be occupied by some person of great local position, influence and popularity', in short, a 'person coming nearer to the usual conditions, and likely to give the business its usual attractions.'[124] Whewell was absolutely correct when he referred to the choice of an aristocratic president as 'the usual conditions'. However, attitudes were changing, as Lyell's response to his refusal made clear. Whewell's nomination, he replied, had been 'warmly received by a full General Committee … and I never knew the meeting more unanimous about anything'. 'Every scruple', he told Whewell,

> on the ground of your not feeling you should carry with you the general conviction of the Association that *you* were the man for them, their interests, and their objects, was unfounded. There has been so much said about our being honoured by so many dukes and marquisses [*sic*] … since you left that the naming of one Mr Whewell as the next President is the only thing that can redeem our proceedings from the reproach of taking a very low standard in the estimate of the real dignity of scientific men.[125]

Whewell's nomination and election to the presidency in 1841 capture well the growing sense of discomfort within the BAAS itself about its favouring of an aristocratic model of science. In Chapter 5 we will trace the development, within the Association and outside, of alternative models of scientific masculinity reflecting the monumental social, economic and political changes British society was undergoing during these years. With the country experiencing the transition to a more meritocratic social and political culture, spearheaded by a newly enfranchised middle class growing in power and influence, the aristocratic man of science appeared increasingly anachronistic, a curious relic of another age.

Notes

1. Orange, 'Idols of the Theatre', pp. 277; 279.
2. Ibid., p. 289.
3. Ibid., p. 294.

4. Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 22.
5. Ibid., p. 33.
6. Ibid., p. 12.
7. Ibid., p. 20.
8. See Shapin, 'A Scholar and a Gentleman', pp. 279–327.
9. See Golinski, 'Humphry Davy: The Experimental Self'; Golinski, 'Humphry Davy's Sexual Chemistry'.
10. 'The Humbugs of the Age. No. III – Sir Humphry Davy', *The John Bull Magazine and Literary Recorder* 1:3 (1824), p. 89.
11. 'Sir Humphry Davy and His Visit to Paris', *The Examiner* no. 304 (Sunday 24 October 1813), p. 675.
12. 'The Humbugs of the Age. No. III – Sir Humphry Davy', p. 89.
13. Ibid., p. 92.
14. Ibid., p. 90.
15. 'Sir Humphry Davy and Mr. Croker', *The Chemist* 2:31 (Saturday 9 October 1824), p. 46.
16. Ibid., p. 47.
17. See Ellen Moers, *The Dandy: From Brummel to Beerbohm* (New York: The Viking Press, 1960), pp. 44–46.
18. Golinski, 'Humphry Davy's Sexual Chemistry', p. 40.
19. Ibid., p. 22.
20. [Brougham], 'The Bakerian Lecture on Some New Phenomena of Chemical Changes', p. 399; [Henry Brougham], 'The Bakerian Lecture on Some Chemical Agencies of Electricity', *Edinburgh Review* 11:22 (January 1808), p. 390.
21. *The Times* (Tuesday 19 October 1813), p. 3.
22. 'The Humbugs of the Age. No. III – Sir Humphry Davy', p. 90.
23. Thomas Carlyle, *Sartor Resartus; The Life and Opinions of Herr Teufelsdröckh* (London: Saunders and Otley, 1838), p. 284.
24. 'The Humbugs of the Age. No. III – Sir Humphry Davy', p. 92.
25. Ibid., p. 90.
26. There is some evidence to suggest that the practice of carrying out chemical experiments on other men came to be associated with homosexual behaviour in some circles. In 1790, for example, the prominent chemist, William Thomson, who was known to Davy through their mutual friend, Thomas Beddoes, was expelled from Oxford on the charge of 'sodomy and other unnatural and detestable practices'. When explaining events to a friend in a let-

ter, he complained that he was suffering 'a most scandalous imputation from an Experiment performed on a man 4 years ago' which seems to have involved an anal thermometer. See H.S. Torrens, 'The Geological Work of Gregory Watt, His Travels with William Maclure in Italy (1801–1802), and Watt's 'Proto-Geological' Map of Italy (1804)' in Gian Battista Vai and W. Glen E. Caldwell eds., *The Origins of Geology in Italy* (Boulder, Colorado: The Geological Society of America, 2006), p. 183.

27. 'The Humbugs of the Age. No. III – Sir Humphry Davy', p. 90.
28. Sydney Smith to Lady Holland (1816), quoted in W. M. Parker, 'Lady Davy in Her Letters', *Quarterly Review* 300 (1962), p. 82. Cited in Golinski, 'Humphry Davy's Sexual Chemistry', p. 37.
29. John Ayrton Paris, *The Life of Sir Humphry Davy* (London: Henry Colburn and Richard Bentley, 1831), p. 268.
30. Golinski, 'Humphry Davy's Sexual Chemistry', p. 41.
31. Ibid., p. 41. For Buckland's original statement, see William Buckland to Roderick Impey Murchison (1832) cited in Elizabeth Oke Gordon, *The Life and Correspondence of William Buckland* (London: John Murray, 1894), p. 123.
32. See p. 74.
33. Orange, 'The Idols of the Theatre'.
34. [John Bowden], 'The British Association for the Advancement of Science', *British Critic* 25:49 (January 1839), pp. 22–23.
35. Ibid., p. 23.
36. Ibid., p. 14.
37. Ibid., p. 16.
38. BL Dep. BAAS 1, Correspondence of John Phillips, William Swainson to John Phillips (15 September 1831), cited in Louise Miskell, *Meeting Places: Scientific Congresses and Urban Identity in Victorian Britain* (Farnham: Ashgate, 2013), p. 105.
39. Ibid., pp. 25–26.
40. Ibid., p. 46.
41. William Cockburn, *Remarks on the Geological Lectures of F.J. Francis* (London, 1839), p. 16.
42. *The Times* (Friday 13 September 1839), p. 4.
43. 'The British Association for the Advancement of Science', *The Times* (Friday 29 March 1839), p. 6.
44. See, for example, Lawrence and Shapin eds., *Science Incarnate*; on attitudes towards solitude specifically, see Lawrence E. Klein,

'Sociability, Solitude and Enthusiasm', *Huntington Library Quarterly* 60:1/2 (1997), pp. 153–177.

45. For accusations of effeminacy against Arnold, see Heather Ellis, '"This starting, feverish heart": Matthew Arnold and the Problem of Manliness', *Critical Survey* 20:3 (2008), pp. 97–115.
46. 'Empedocles on Etna' in Matthew Arnold, *Empedocles on Etna, and Other Poems* (London: B. Fellowes, 1852), p. 62.
47. [Bowden], 'The British Association for the Advancement of Science', p. 27.
48. John Robison to John Phillips (5 October 1834), cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 134.
49. Ibid., p. 128.
50. John Phillips to William Currie (7 November 1837), cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 135.
51. William Charles Henry to William Vernon Harcourt (29 September 1836) in Morell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 236.
52. [Bowden], 'The British Association for the Advancement of Science', p. 26.
53. On the figure of the actor throughout history, see Garrett P.J. Epp 'To "Play the Sodomites": A Query in Five Actions' in Noreen Giffney and Michael O'Rourke eds., *The Ashgate Research Companion to Queer Theory* (Abingdon: Ashgate, 2009), p. 182.
54. [Moll], *On the Alleged Decline of Science in England*, p. 32.
55. [Granville], *Science Without A Head*, p. 5.
56. Ibid., p. 15.
57. *John Bull* (1835), p. 284. Cited in Orange, 'Idols of the Theatre', p. 280.
58. William Cockburn, *A Remonstrance…Upon the Dangers of Peripatetic Philosophy* (London: J. Hatchard and Son, 1838), pp. 5; 26.
59. *The Times* (Thursday 28 June 1832), p. 4.
60. *The Literary Gazette* (Saturday 27 August 1836), p. 545; this analogy drew, of course, on the contemporary trend for describing prominent scientists as 'lions', a tendency we have already dis-

cussed (see p. 66). It is important to note that this was not always a negative image and was one sometimes used by the BAAS themselves. See, for example, Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 58.

61. For the importance of Christ as a model of masculinity and the discourse of the 'manliness of Christ', see William Van Reyk, 'Christian Ideals of Manliness in the Eighteenth and Early Nineteenth Centuries', *Historical Journal* 52:4 (2009), pp. 1053–1073.
62. [Bowden], 'The British Association for the Advancement of Science', pp. 29–30.
63. See p. 67.
64. [Bowden], 'The British Association for the Advancement of Science', p. 28.
65. See p. 53.
66. Cockburn, A *Remonstrance*, pp. 20–21.
67. [John Gibson Lockhart], 'Pencillings by the Way; First Impressions of Foreign Scenes, Customs, and Manners', *Quarterly Review* 54:108 (September 1835), p. 466.
68. [Lockhart], 'Pencillings Along the Way', p. 466.
69. Thomas Carlyle, *On Heroes, Hero-Worship and the Heroic in History* (London: Chapman and Hall, 1840).
70. Van Reyk, 'Christian Ideals of Manliness in the Eighteenth and Early Nineteenth Centuries'.
71. Carlyle, *On Heroes,* p. 202.
72. Ibid., p. 220.
73. Ibid., p. 185.
74. Ibid., p. 202.
75. Ibid., p. 206.
76. In the 1820s, Carlyle had been a paid assistant to David Brewster, working on his Encylopedia.
77. Thomas Carlyle to Jane Carlyle (7 September 1837) in Brent E. Kinser ed., *The Carlyle Letters Online* (Duke University Press, 14 September 2007), http://carlyleletters.dukeupress.edu//online_project [Last accessed 18 April 2016].
78. [Bowden], 'The British Association for the Advancement of Science', pp. 23–24.

79. *The Times* (Thursday 28 June 1832), p. 4.
80. *The Morning Post* (5 September 1838), cited in Miskell, *Meeting Places*, p. 122.
81. *The Newcastle Courant* (20 July 1838), cited in Miskell, *Meeting Places*, p. 121.
82. See p. 76.
83. [Bowden], 'The British Association for the Advancement of Science', p. 31.
84. See p. 70.
85. [Bowden], 'The British Association for the Advancement of Science', p. 33.
86. For a useful analysis of the scandal, see J.N. Hays, 'The Rise and Fall of Dionysius Lardner', *Annals of Science* 38:5 (1981), pp. 527–542.
87. 'The Infamous Lardner Case', *The Age* (Sunday 9 August 1840), p. 251.
88. 'Elopement in Fashionable Life', *The Age* (Sunday 22 March 1840), p. 93.
89. 'Dr. Lardner's Case', *The Morning Post* (Monday 3 August 1840).
90. *The Morning Post* (Friday 7 August 1840), p. 4.
91. For the description of Lardner as ugly and short, see 'Elopement in Fashionable Life', *The Age* (Sunday 22 March 1840), p. 93. Contemporary accounts also draw a sharp contrast between the ugly Lardner and the beautiful Mrs Heaviside. Poking fun at his classical forename, she is described as 'Hyperion' to his 'satyr'.
92. 'Captain Heaviside and Dr. Lardner', *Freeman's Journal and Commercial Advertiser* (Thursday 23 April 1840).
93. *The Morning Post* (Friday 7 August 1840), p. 4.
94. For references to Lardner having recourse to 'drugs' and 'animal magnetism', see *The Satirist, or Censor of the Times* (Sunday 12 April 1840), p. 117. For the accusation that he used a 'mesmerian process', see *The Satirist, or the Censor of the Times* (Sunday 24 May 1840), p. 161.
95. See p. 91.
96. 'Dr. Lardner's Case', *The Morning Post* (Monday 3 August 1840).
97. See, for example, 'The Infamous Lardner Case', p. 251.
98. *John Bull* (Sunday 2 August 1840), p. 372. For the suggestion that Lardner was incapable of performing sexually, see 'Elopement of Fashionable Society', p. 93.

99. 'The Infamous Lardner Case', p. 251.
100. 'Dr. Lardner's Case'.
101. Ibid.
102. Ibid.
103. *The Morning Post* (Friday 7 August 1840), p. 4.
104. W. Dexter ed., *The Letters of Charles Dickens Vol. I*, ed. W. Dexter (Bloomsbury: Nonesuch Press, 1938), p. 154.
105. *The Times* (Monday 7 September 1840), p. 6.
106. *The Satirist, or the Censor of the Times* (Sunday 6 September 1840), p. 284.
107. Charles Babbage to Charles Daubeny (28 April 1832), cited in Morrell and Thackray eds., *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 111.
108. Babbage, *Reflections on the Decline of Science*, p. 48.
109. James F.W. Johnston, 'First Meeting of the British Association for the Advancement of Science, held at York in September 1831', *Edinburgh Journal of Science* 6:11 (1832), p. 7.
110. See p. 73.
111. For more on the discourses of observation and objectivity in science, see Lorraine Daston and Peter Galison, *Objectivity* (Brooklyn, NY: Zone Books 2007); Lorraine Daston and Elizabeth Lunbeck eds., *Histories of Scientific Observation* (Chicago: University of Chicago Press, 2011).
112. Babbage, *Reflections on the Decline of Science in England*, p. 182.
113. Secord, *Visions of Science*, p. 71. We have seen, though, in the case of Dionysius Lardner, who lectured on Babbage's Difference Engine, that even advocacy of a mechanical, impersonal vision of science could provoke (and be satirized in) gendered accounts of science and men of science as effeminate or unnatural.
114. John Robison to Roderick Impey Murchison (20 January 1834) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 183.
115. John Robison to John Phillips (5 October 1834) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 193.
116. John Robison to John Phillips (23 September 1835) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 217.

117. Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 217.
118. Roderick Impey Murchison to William Vernon Harcourt (18 September 1837) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 255.
119. Roderick Impey Murchison to William Whewell (29 September 1840) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 341. Cited in Miskell, *Meeting Places*, p. 87.
120. Ibid., p. 257.
121. John Philips to William Vernon Harcourt (August 1837), cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, p. 251.
122. William Vernon Harcourt to Roderick Impey Murchison (2 August 1838) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 268.
123. Charles Lyell to William Whewell (23 September 1840) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, pp. 336–337.
124. William Whewell to Roderick Impey Murchison (18 September 1840) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, p. 333.
125. Lyell to Whewell (23 September 1840) in Morrell and Thackray eds., *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science*, pp. 336–337.

CHAPTER 5

Thomas Carlyle, the X-Club and the Hero as Man of Science

'Nobleness of Mind'

When Bowden penned his attacks on the BAAS in the *British Critic* in 1839, he also constructed an alternative model of masculinity involving a rehabilitation of the traditional figure of the scholar. Unlike Davy and the BAAS, he did not attempt to associate scholarly and scientific work with radically different masculine ideals like the aristocratic gentleman; rather, he asked his readers to recognize as manly and valuable those qualities and circumstances of the scholar's life which many commentators had condemned as effeminate. Most obviously, moreover, he sought to do this through an alternative interpretation of the character and career of the chief historical hero of the British Association—Francis Bacon himself. To emphasize his status as a celibate monk (a fact the BAAS certainly avoided), Bowden referred to him as 'Friar Bacon' and described his life as a 'solitary student, wasting the midnight oil in his cloister'.[1]

Bowden, though, presented Bacon's reclusive life as evidence of his manly dedication, hard work and endurance. By choosing to live alone in a monk's cell, he argued, Bacon proved his masculine independence, his ability to thrive on his own without needing the society of others. He was 'one healthy mind in its own innate boldness', capable of far greater independence of mind than the members of the British Association, tied together as part of 'a great compound philosophical machine'.[2] It was Bacon's very isolation, Bowden argued, which ensured his scientific objectivity and allowed him to escape the pull of current fashions and concerns.

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
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His removal from the world enabled him to perceive its workings more clearly: 'It is less possible that the many, acting in concert should originate or admit of reasoning opposed to the current ideas and prejudices … of the day, than that one isolated philosopher, acting for himself, should have courage or penetration to do so.'[3] In this article, he worked hard to valorize the life of the isolated scholar by associating it with traditionally masculine virtues: 'boldness', 'courage', 'penetration'.

At several annual meetings, especially at Oxford in 1832, the BAAS liked to imagine that Bacon, were he present, would have approved of their efforts and endorsed their cause, modelled closely as the Association was on his *New Atlantis*. Knowing this, Bowden proceeded to turn this happy image on its head. Having established his alternative image of Bacon as an ascetic hero, bold and courageous in his isolation, Bowden described the unmanning effect which he thought the foppish sociability of BAAS meetings would really have had on Bacon and his work were he alive in 1839:

> Friar Bacon, had he lived in these times, would have been drawn forth from his cell at Oxford, which witnessed the slow and solitary concoction of his Opus Majus, into a sort of fashionable atmosphere of science, to a series of meetings … where the thoughts, which, as it is, he has stored in his thick ponderous folios, would have come forth by driblets, as snatches, fragments, or opuscula.[4]

In this image, Bowden literally describes the transformation of the scholar into the gentleman which the BAAS had been so keen to promote in its early years—and with terrible effects. We see that Bacon's great masculine achievement, his 'Opus Majus', the chief inspiration for the Association itself, does not appear as a single work, strong, bold and powerful, but emerges rather gradually and ineffectually in small diminished 'driblets', 'snatches' and 'fragments'. Here Bacon stands as a symbol for the emasculation of all men of scientific talent when they are forced to associate, to combine in an atmosphere of decadent sociability, where concentration and concerted effort are impossible. 'The principle of such association', wrote Bowden, '… though it might and would extend the dwarfish proportions of the duller and less aspiring … would as certainly contract and narrow the vigorous and expansive faculties of the giants in intellect.' As members of 'a party—a *clique*', such men would be induced to 'measure themselves by it, to take it as a standard' rather than 'that larger

society, the great of all climes and ages, or, which would be fitter still … truth in itself'.[5]

For Bowden, the most important characteristics of masculinity were humility and sincerity, traits which, he argued, the solitary scholar, set apart from the world, tended to possess in abundance. We have seen his presentation of Bacon as a world-renouncing friar in his cell; his depiction of other scientific greats including Newton was similar. Thus, he cited, with approval, Newton's declaration that 'in all his discoveries, he was but picking up shells by the ocean of truth'.[6] There couldn't be a greater contrast, wrote Bowden, between this traditional ideal of the philosopher and the foppish, self-seeking figure of the gentleman-scientist whose ultimate aim was to 'astonish' and 'dazzle' his audience:

> [T]he current idea now entertained of a philosopher presents not the image of one who by dint of deep reflection, or of converse with the past, has opened up new springs of moral truth … but of one who by a series of skilful manipulations has succeeded in producing some visible effect of a striking view … who can astonish us by dissolving the insoluble, by burning the incombustible, or dazzle us by some light more brilliant than has yet shone upon human eyes.[7]

In a number of ways, Bowden was articulating an ideal of masculinity remarkably similar to that which Thomas Carlyle would put forward the following year in 1840 during his lectures on *Heroes, Hero-Worship and the Heroic in History*. Writing to his sister Jemima in April 1839, John Henry Newman, leader of the Oxford Movement and close friend of Bowden, described Carlyle as a 'profound and original' writer, whose principles, while not always 'very *clear*', he nonetheless admitted to be 'very deep'.[8] Both Newman and Carlyle shared a belief in the deep importance of spirituality, sincerity and humility as the chief marks of manliness. Both prized the religious character above all others—while differing greatly in their actual religious views (Carlyle despised organized religion while Newman stood at the head of a controversial faction within the Anglican Church). Newman's friend, J. A. Froude, recognized their similarity when he compared the two directly in his *Short Studies on Great Subjects*. Both men, he noted, insisted on sincerity in religion. Anything other than 'certainty' in matters of faith 'was a mockery and a horror' to them.[9]

In his lectures, *On Heroes*, Carlyle fashioned an image of the 'Hero as Man of Letters', in some ways profoundly similar to Bowden's

depiction of Bacon as the reclusive and humble, yet bold and independent, scholar. James Eli Adams has interpreted Carlyle's heroic vision of the 'man of letters' as an attempt to redeem the 'manfulness' of intellectual labour by presenting the male writer as a 'latter-day priest' or 'prophet'.[10] Citing Fichte, Carlyle argues that in our modern existence we see only the 'vesture' or 'sensuous Appearance' of things; that underlying everything we see in the world is a divine 'essence' or 'idea', 'the Reality which "lies at the bottom of all Appearance".' The vast majority of men cannot apprehend this 'Divine Idea'. '[T]hey live merely', writes Carlyle, '… among the superficialities, practicalities and shows of the world, not dreaming that there is anything divine under them.' But the man of letters is different. Like a priest or prophet of old, he 'is sent hither specially that he may discern for himself, and make manifest to us, this same Divine Idea'.[11]

Like Bowden's presentation of Bacon and his magnum opus, the man of letters' ability to recognize and communicate this 'Divine Idea' is derived, at least in part, from his isolation from the world. Samuel Johnson is given as an example. Locked up in his garret, poor and starving, he eschews the superficialities and trivialities of the world; yet he has a 'giant invincible soul; a true man's': bold, sincere and long-suffering: 'Wet feet, mud, frost, hunger or what you will; but not beggary: we cannot stand beggary! Rude stubborn self-help here; a whole world of squalor, rudeness, confused misery and want, yet of nobleness and manfulness withal.' Yet, for all Johnson's boldness, Carlyle tells us that sincerity, loyalty and humility mark out his character with equal force, just as Bacon appears both bold and humble in Bowden's depiction. 'And yet with all this rugged pride of manhood and self-help, was there ever soul more tenderly affectionate, loyally submissive to what was really higher than he?'[12]

If we look more closely, however, at Bowden's and Carlyle's visions of the reinvigorated scholar-hero and hero as man of letters respectively, we notice some significant differences. While Bowden genuinely reverenced the scholar as a masculine ideal, exemplified most explicitly in his portrait of 'Friar Bacon', Carlyle was more ambiguous, betraying, at times, traces of the centuries-old suspicion about the masculinity of those who earn their living by books. The man of letters, he writes, 'with his copy-rights and copy-wrongs, in his squalid garret, in his rusty coat … is a rather curious spectacle! Few shapes of Heroism can be more unexpected.'[13] While, in more ancient times, heroes like Odin were taken for gods and worshipped, and others like Mohammed were received as divinely inspired

prophets, men of letters in the nineteenth century, 'wise and great' though they might be, were treated rather like 'some idle non-descript, extant in the world to amuse idleness'.[14] Thus, among all of Carlyle's categories of hero, the man of letters is the least appreciated by his contemporaries. Indeed, like the figure of the scholar, he was ridiculed as 'idle' and useless, theatrical even, as Carlyle suggests when he describes him as having 'a few coins and applause thrown him'.[15] Carlyle himself criticizes one of the three men of letters he identifies as heroes in this category—Rousseau—as not merely theatrical but effeminate:

> His Books, like himself, are what I call unhealthy; not the good sort of Books. There is a sensuality in Rousseau. Combined with such an intellectual gift as his, it makes pictures of a certain gorgeous attractiveness: but they are not genuinely poetical. Not white sunlight: something *operatic*; a kind of rosepink, artificial bedizenment.[16]

Carlyle's scepticism towards the heroic possibilities of men of letters was likely compounded by his personal experience of meeting male writers he had previously idolized. His reaction to Samuel Taylor Coleridge exemplifies this well. Having imagined him as a divinely inspired poet, toiling and struggling to compose beautiful works in an increasingly mechanistic and hypocritical world, what he encountered shocked him: a 'fat, flabby incurvated personage', the very opposite of his masculine ideal. 'His cardinal sin is that he wants *will*', wrote Carlyle to his brother in 1824, having met him in person:

> [H]e has no resolution, he shrinks from pain and labour in any of its shapes. His very attitude bespeaks this: he never straightens his knee joints, he stoops with his fat ill shapen shoulders, and in walking he does not tread but shovel and slide … his eyes have a look of anxious impotence; he *would* do with all his heart, but he knows he dare not.[17]

Carlyle was indeed to be repeatedly disappointed by the men of letters he admired. 'Good Heavens! I often inwardly exclaim', he wrote, 'and is *this* the Literary World? … The very best of them are ill-natured weaklings: they are not red-blooded *men* at all, they are only *things* for writing "articles".'[18] It seemed sometimes to Carlyle (as to many of his contemporaries) that formal education through books and true manliness did not go together: '[I]t is only among what are called the *un*-educated classes (those educated by experience) that you can look for *a man*.'[19]

Here, we also see evidence of Carlyle's antipathy towards the well-born gentleman as a masculine ideal. This is something he shared with Bowden. Both viewed 'nobleness of mind' as a characteristic of manliness, rather than nobleness of birth. Carlyle's ideal hero, according to Norma Clarke was the 'natural man', 'gifted but undeveloped, rugged, abrupt, unpolished, with an uncorrupted, instinctive commitment towards the morally true'.[20] In his 1831 essay, *Characteristics*, published the same year as the BAAS was founded, Carlyle exemplified the effeminacy of his own times with reference to a book recently published by the writer and art collector, Thomas Hope, entitled *An Essay on the Origin and Prospects of Man*. It was a curious work, attempting to combine 'the study of phenomena which appertain to the moral world' with 'those … that set forth the … physical properties of matter'.[21] Carlyle condemned it: 'What can we say', he asked, 'except, with sorrow and shame, that it could have originated nowhere save in … the head of an English gentleman.'[22]

For Carlyle, both moral philosophy and 'Experimental Science' were part of the same essential phenomenon, which, for him, embodied the peculiar sickness of the age. What he termed 'Sceptical or Inquisitory Metaphysics', was the 'second or sick stage' in the development of man's thought. In ancient times, he argued, great men were driven by 'inspiration' rather than 'speculation'. In place of metaphysical and scientific systems, human beings perceived the world through 'Theologies and Sacred Cosmogonies', which provided certainty and stability to those who believed in them. In so doing, wrote Carlyle, religious theologies contained 'much good', affording 'satisfaction', an 'anodyne to doubt' and 'an arena for wholesome action'.[23] By contrast, sceptical metaphysics consisted of nothing more than 'a painful, captious, hostile question towards everything in the Heaven above, and in the Earth beneath'.[24] It gradually replaced those older systems of belief, divorced speculation from action and unmanned the thinker, who was led nowhere but round in circles. '[T]here is no more fruitless endeavour', wrote Carlyle, 'than this … which the Metaphysician … toils in: to educe Conviction out of Negation … as it begins in No or Nothingness, so it ends in Nothingness; circles and must circulate in endless vortices; creating, swallowing—itself.'[25] Man, mused Carlyle, was placed on earth 'not to ask questions, but to do work'. As such, the time in which he was living 'must be the heaviest evil' for man, with his 'faculty of Action' lying dormant, and only that of 'sceptical Inquiry' exerting itself.[26]

Earlier, we noted Carlyle's tendency to associate a certain theatricality and idleness with the figure of the man of letters. The source of this

association is arguably Carlyle's view that an effeminate foppery, characterized, above all, by an extreme self-awareness and need to interrogate everything seemed to dominate and determine the character of the age he was living in. By contrast, those eras most productive of heroes were those which were the least self-conscious. For Carlyle, 'originality' (by which he meant, not novelty, but unfeigned attachment to, and faith in old, well-established beliefs)[27] and 'sincerity' were the 'genius' of the hero.[28] Those who were not aware of their own greatness were, by definition, the greatest. 'If we now … examine, by this same test of Unconsciousness, the Condition of our own Era', wrote Carlyle, 'and of man's Life therein, the diagnosis we arrive at is nowise of a flattering sort.'

> The state of Society in our days is, of all possible states, the least an unconscious one: this is specially the Era when all manner of Inquiries into what was once the unfelt, involuntary sphere of man's existence, find their place, and, as it were, occupy the whole domain of thought. What, for example, is all this that we hear … about the Improvement of the Age, the Spirit of the Age, … Progress of the Species, and the March of Intellect, but an unhealthy state of self-sentence, self-survey; the precursor and prognostic of still worse health?[29]

In this tirade against those who make 'Inquiries into what was once the unfelt, involuntary sphere of man's existence', Carlyle is targeting writers like Thomas Hope who attempt to explain the workings of the world not with reference to a divine creator, but rather to the workings of a lifeless machine. As he wrote of Hope's *Essay*, 'the First Cause is figured as a huge Circle, with nothing to do but radiate gravitation towards its centre'. Its author constructs 'a Universe, wherein all, from the lowliest cucumber … up to the highest seraph … were but "gravitation", direct or reflex, in more or less central globes'.[30] It is here, in Carlyle's treatment of Hope that we see explicitly the combination of the mechanical and the self-conscious—both traits characteristic of effeminate superficiality and dissimulation, the polar opposite of Carlyle's 'sincerity' and 'originality', the 'genius' of his heroism. While Hope attempted in his *Essay* to account for the origin and development of the human race with reference to a mechanical system of 'gravitation', he also had a significant reputation as a high society fop. While travelling in Turkey in his youth, Hope became famous for abandoning Western dress and Christianity. Contemporary accounts portray him as 'ill-looking and effeminate in manner', commenting particularly on his

'widely-acknowledged conceit' and the 'grand' and 'magnificent' scale on which he did everything.[31]

However, while Thomas Hope merged the metaphysician with the experimental scientist, Carlyle went on to draw an important distinction between the two. The former he identified with the figure of the 'Scholar', a character he considered to be truly impotent. The scholar 'learns' and 'imitates' only; he does not act. 'Could you ever spell-bind man into a scholar merely', declared Carlyle, 'so that he had nothing to discover, to correct; could you ever establish a Theory of the Universe that were entire, unimprovable, and which needed only to be got by heart; man then were spiritually defunct, the Species we now name Man had ceased to exist.'[32] 'Experimental Science', by contrast, for all its scepticism and self-consciousness, held out some hope of progress.[33] It offered new, higher roles in the field of inquiry; it promised that men might be more than scholars—teachers and discoverers. 'Man's task here below', wrote Carlyle, towards the end of *Characteristics*, 'is to be in turns Apprentice and Workman, or say rather, Scholar, Teacher, Discoverer'. He is not merely able to learn and to imitate; he has 'also a strength for acting, for knowing on his own account'.[34] This capacity for action and 'knowing on one's own account' meant finding things out for oneself, by experiment or some other method, rather than receiving knowledge, passively, through books. The one thing which gave Carlyle hope, he wrote, was 'the clear ascertainment that we are in progress'.[35]

Unlike Bowden, for whom, the scholar as hero was 'a being of other days',[36] Carlyle looked to modern experimental science with some expectancy. 'As Phlogiston is displaced by Oxygen, and the Epicycles of Ptolemy by the Ellipses of Kepler',[37] he wrote, so it has 'become evident to every one, that this wondrous Mankind is advancing somewhither'.[38] Scepticism and inquiry now seemed to be the necessary precursors to achieving new certainties. 'Thought must needs be Doubt and Inquiry', he wrote, 'before it can again be Affirmation and Sacred Precept.'[39] Science, at least, unlike mere scholarship, spurred to action, pointed ways forward. This is what Carlyle meant when he said of his favourite man of letters, Samuel Johnson, that he 'was far other than a mere man of words and formulas; he was a man of truths and facts.'[40] Through the development of modern experimental science, and its promise to reunite thought and action, it was conceivable that intellectual labour could once again be truly heroic. As Carlyle put it, 'a Faith in Religion has again become possible and inevitable for the scientific mind.'[41]

An examination of Carlyle's presentation of the scholar and the scientist as masculine role models helps us to contextualize and better understand changing attitudes towards the figure of the gentleman-scientist, cultivated by the BAAS in its first decade. In the years leading up to the Association's foundation in 1831, the dominant ideal and discourse of elite masculinity was aristocratic. Science, itself, as we saw in Chapters 2 and 3, tended to be associated with the problematic figure of the reclusive scholar. The gentry and aristocracy, by contrast, continued to possess significant cultural authority which the BAAS worked hard to draw upon. As John Tosh has shown, in the early 1830s, the term 'gentleman' still primarily designated a man of high birth with significant wealth and property.[42] It embodied what James Eli Adams refers to as the stereotype of 'aristocratic' or 'rakish Georgian masculinity'.[43] Above all, it was understood as an ascribed, rather than an achieved status. Under the combined pressure of industrialization and evangelicalism, which made itself increasingly felt in the 1830s and 1840s, ideals of masculinity underwent a significant, even drastic, shift.[44] Carlyle himself expressed this well as early as 1831. '[T]he old ideal of manhood has grown obsolete', he declared, 'and the new is still invisible to us, and we grope after it in darkness, one clutching this phantom, another that.'[45]

Most important in this shift was the increasing move away from an emphasis on birth, wealth and inherited status towards individual merit, moral worth and self-discipline: from nobleness of birth to nobleness of character. As part of this process, the 'gentleman' was actively reimagined as 'an incarnation of ascetic discipline and infused with the fabled Victorian earnestness'. Such a shift came about, at least in part, Adams argues, in response to the changing needs of 'an increasingly pervasive market economy' and more flexible social hierarchy as rank gave way to new class identities.[46] 'The gentleman', he writes, 'was thereby rendered compatible with a masculinity understood as a strenuous psychic regimen, which could be affirmed outside the economic arena, but nonetheless would be embodied as a charismatic self-mastery akin to that of the daring yet disciplined entrepreneur.'[47]

It is important to note, however, that the 'gentleman', even as an ideal reimagined to emphasize hard work and merit, remained an elite model of masculinity.[48] Carlyle himself showed little interest in refashioning the idea of the gentleman. He only used the term negatively to chastise the foppish and decadent aristocrats who represented the antithesis of his sincere and rugged heroism.[49] He did, however, play an important part in shifting

ideals of masculinity towards emphasizing very different qualities—outspokenness, sincerity, faith and self-discipline. The furthest he went towards a rehabilitation of the gentleman was in endowing his heroes with 'nobleness' of mind and soul. Carlyle's depiction of the 'Experimental Scientist' in *Characteristics*, with his capacity for meaningful action and progress, was explicitly *not* a gentleman. The reconciliation between the man of science and the gentleman, reconceived in terms of talent, self-discipline and moral character, would be the task of others. It was to be the rising generation of scientists within the British Association, beginning their researches amidst the vitriolic criticisms and attacks of the 1830s and 1840s, who would make this their vision of a reinvigorated masculine science.

The Red Lions and the X-Club

Carlyle pointed to a very different image of the man of science from the gentleman-scientist favoured by the BAAS and for which the Association was heavily criticized in its first decade. For Carlyle, the Experimental Scientist, with his focus, not on idle speculation, but active experimentation, designed to improve human life, was a potential figure of hope, a truly modern hero, whose masculine appeal lay in his nobleness of character and capacity for self-discipline. He was a figure who resonated strongly with many younger scientists coming to prominence within the BAAS in the 1840s and 1850s. Arguably, we can see this as early as 1839 when an informal dining club, which came to be known as the 'Red Lions', first met during the BAAS meeting then being held at Birmingham.

The Red Lions, named after the inn in which they first assembled, were composed of a group of young naturalists led by the then president of Section D (Biology), Edward Forbes (aged twenty-four). In his biography of Forbes, published a year after his untimely death in 1854, J. H. Bennett, described the repugnance he and his friends felt for the 'great expenses of the [BAAS] ordinary', preferring instead to dine on beef and beer at a 'small tavern which presented the sign of the "Red Lion"'.[50] His fellow Red Lions, George Wilson and Archibald Geikie, described Forbes and his friends dining 'daily at small expense, on beef cooked in various fashions, moistened with sundry potations of beer … in contradistinction to the endless dishes and wines … of the "big wigs"' at the BAAS dinners.[51] Daniel Brown has gone so far as to deem the gatherings an 'alternative association'.[52] The group was comprised of young men, mostly in their twenties and early thirties, who sought to create

a completely different model of scientific sociability. Not only did they spurn the 'sheer extravagance' of the formal BAAS meeting; they preferred an all-male company to the explicitly mixed-sex gatherings of the Association proper.[53] After the initial dinner in 1839, they met annually at each subsequent BAAS meeting, and from November 1844, following Forbes's move to London, also in the capital under the banner of the Metropolitan Red Lions Association.

The development of the Red Lions deserves to be seen as part of the growing internal criticism of the Association's preferred model of aristocratic sociability and the broader social critique from publications like *The Times* and the *British Critic*. The Birmingham meeting, after all, came only two years after the particularly extravagant feasting at Liverpool when Adam Sedgwick asked: 'Were ever philosophers so fed before?'[54] The young biologist, T.H. Huxley, who, together with his friend John Tyndall, first dined with the Red Lions at the 1851 BAAS meeting in Ipswich (he had joined the Metropolitan Lions the previous year), recalled that it had been established 'by way of counterblast to the official banquets of the Association, with their high tables and what we irreverently termed "butter-boat" speeches'. He described the dining club, almost as an inversion of the official Association with its aristocratic sociability and concern for social hierarchy. 'Being young with any amount of energy, no particular prospects, and no disposition to set about the ordinary methods of acquiring them, we could conduct ourselves with perfect freedom', he declared. We 'made a point', he continued, 'of holding a feast of Spartan simplicity and anarchic constitution with rites of a Pantagruelistic aspect'. These rites included the deliberate satirizing of the presidential address and other important features of the official meeting.[55]

Although the Red Lions have sometimes been dismissed as a 'merely convivial group',[56] they had serious plans for the reform of science. Just as they preferred 'Spartan simplicity' to the extravagance of BAAS feasting, so they maintained that only working men of science, actively pursuing a programme of research should be admitted as members. In essence, the Red Lions club went a long way towards developing the 'new code of conduct' for the man of science, which historians have tended to attribute to T.H. Huxley and the X-Club over twenty years later.[57] This new code of conduct had little to do with the 'professionalization' of science, as has often been argued; rather, it involved what Steven Shapin would term a 'respecification' of the scientific gentleman to emphasize hard work, talent and self-discipline under the influence of Carlylean ideals of

heroism. Dilettante hangers-on were not welcome. This attitude is clear from a wonderful poem, 'A Yawn from a Red Lion', composed by Edward Forbes, to record one of their monthly dinners in London in May 1851. The club's members are described as follows:

> These Lions were of British Breed; the roars
> Of some had echoed through the World; and all
> Had roared to purpose, more or less,
> Or they had not been Lions, as I guess,
> For many scores
> In Lions skins, have only brayed, withal.
> But these were *real* Lions, every one.[58]

Although we know that the club was named after the inn where its members first met, their self-description as 'lions' is interesting, given the tendency within the BAAS and society, more broadly, to refer to the heroes or great men of science as lions. It implies what the lines in the poem quoted above seem to confirm: self-confidence in their scientific abilities, in the importance of their research and in their public reputation. It is not too much to suggest that when Forbes referred to the members of his club as '*real* Lions, every one', and contrasted them with the 'many scores / In Lions skins' who 'have only brayed, withal', he was arguing that the real scientific talent of the BAAS, the real lions, were not those older men, feted by the Association, but the younger generation, who defined themselves by their work and character. Indeed, in the same poem, we see an explicit rejection of older aristocratic definitions of the gentleman, condemned here as 'smooth politeness'.[59] The language of the gentleman is not rejected *per se* (as it was by Carlyle); indeed, the Lions are explicitly referred to by Forbes as 'a gentlemanly set'; yet they '[d]isdain glitter and parade', are 'sick of bustle, crowds and fuss / Foreign receptions; monkey airs / And … being polite'. Here, we see men of science, like many others belonging to the social elite in early Victorian society, rejecting the masculine model of gentlemanly politeness in favour of a respecified notion of the gentleman associated with 'wisdom' and merit.[60] The 'royalty' of the Red Lions, which Forbes refers to on a number of occasions, is one of intellect and character; like their notion of the 'gentleman', it is defined by scientific talent, hard work and self-discipline.[61]

Some historians have acknowledged the importance of the Red Lions in pointing towards the 'future' of the BAAS as a 'society that would value research merit over Anglican and aristocratic privilege';[62] there has,

however, been little attention paid to its significance in the development of the network of friendships which would later come to form the X-Club, a group of nine naturalists, comprising T. H. Huxley, Edward Frankland, John Tyndall, John Lubbock, Joseph Hooker, Herbert Spencer, Thomas Archer Hirst, William Spottiswoode and George Busk, who have often been credited with pioneering the professionalization of science.[63] Over more than twenty years, from their formation in November 1864, the Club operated, in the words of James Moore, as 'the most powerful coterie in late-Victorian science'.[64] Ruth Barton's work shows clearly how they formed 'interlocking directorships on the councils of many scientific societies' and became 'leading advisers to government'.[65] John Fisk, a supporter of Darwin, who was invited to dine with the X-Club in 1873 described them as 'dict[ating] the affairs of the British Association'.[66]

From Huxley's account of the Red Lions dinner at the 1851 BAAS meeting at Ipswich, we know that he attended it together with John Tyndall. Huxley also tells us that the two men became friends with another future member of the X-Club, Joseph Hooker, during the same BAAS gathering. 'It was at the Ipswich meeting', Huxley recalled, 'that Tyndall and I fell in with Hooker, just returned from the labours and perils of his Himalayan expedition, and who was to make a third in this little company of those who were, thenceforward to hold fast to one another through good and evil days.'[67] Although it is not recorded, it seems probable that Hooker also attended the Red Lions dinner at Ipswich. John Lubbock's signature is recorded on a serviette signed by all who attended a meeting of the dining club at the Aberdeen meeting of the BAAS on 19 September 1859.[68] We know, moreover, from other sources, that along with Huxley and Tyndall, fellow X-Club members, Thomas Hirst and George Busk, also attended meetings of the Metropolitan Red Lions before the formation of the X-Club in 1864. Indeed, Busk is recorded taking part as early as April 1845.[69] Hirst recalled Tyndall's initiation into the club in his journal in January 1854 when both men attended a dinner in London chaired by Forbes.[70] With no less than five (possibly six) future members of the X-Club taking part in either or both the Red Lions Club dinners at BAAS meetings and the monthly Metropolitan gatherings in London, the dining club emerges as an important part of what Barton has termed the 'X-Network'.[71]

As well as continuity of membership, both groups shared a similar masculine ideal of the scientist. Both the Red Lions and the X-Club stressed the need to do away with aristocratic patronage and extravagant

entertainment, cultivating instead the image of the hard-working, self-disciplined, morally earnest man of science. Hannah Gay and John W. Gay have described Red Lions founder, Edward Forbes, as conceiving of science as a 'spiritual quest'.[72] His close friends and biographers, George Wilson and Archibald Geikie, wrote of his ambition to 'bind his companions into a brotherhood of earnest and true men'.[73] We likewise recall his poem from 1851 describing all the Lions as 'roaring with purpose'. Similar sentiments were expressed by Forbes during Tyndall's initiation into the Metropolitan Red Lions in January 1854. Hirst records Forbes venturing 'to prophesy that this young brother Lion of theirs [Tyndall] was destined to wag his tail with effect among men and lions; and to make his roar heard throughout the forests of science'.[74]

Forbes's vision of the man of science is strongly reminiscent of the heroic ideal set out by Thomas Carlyle. As James Secord reminds us, Carlyle's writings, in particular, his *Sartor Resartus*, 'became a spiritual guide for thousands of readers in Europe and America, especially young men in search of a creed to replace traditional Christianity'.[75] His message to the rising generation of scientists, who rejected both traditional Christianity and materialism, was a powerful one, namely that '[t]he evolution of matter and of life need not lead to a world devoid of spirit and governed solely by material processes'.[76]

Carlyle's influence upon a group of young scientists, known to historians as the 'scientific naturalists', and which included the future members of the X-Club, has long since been recognized by Frank Turner.[77] The group shared the broad aim of reforming Victorian science, particularly with a view to freeing scientific researchers from the trammels of religion and politics and to projecting scientific method as the only means of understanding the natural world. As Huxley urged Christian socialist and fellow Carlyle enthusiast, Charles Kingsley, in a letter of 1860: 'Understand that this new school of the prophets is the only one that can work miracles, the only one that can constantly appeal to nature for evidence that it is right.'[78]

Through the publication of *Sartor Resartus*, in particular, Carlyle introduced German Romanticism and idealism to the next generation of scientists including the future members of the X-Club. According to Turner, 'Huxley, Tyndall, Morley, Galton, and even Spencer drew upon Carlyle's wisdom in their early manhood.'[79] John Morley, who went on to be editor of the *Fortnightly Review*, claimed that Carlyle 'has done more than anybody else to fire men's hearts with a feeling for right and an eager desire for social activity'.[80] His appeal to the scientific naturalists lay, above all,

Turner writes, in his demand for a new intellectual elite and a new ideal of scientific manhood. 'Carlyle believed the problems of Britain's social and physical well-being should be addressed by leaders whose authority and legitimacy stemmed from talent, veracity, and knowledge of facts.'[81] A similar emphasis on meritocracy characterized the X-Club's reinvention of the scientific-gentleman and drove their attempts to remove all aristocratic and theological influence from scientific societies including the Royal Society and British Association.

Recalling the beginning of his friendship with Tyndall, when they attended the 1851 BAAS meeting at Ipswich together, Huxley started by acknowledging their shared debt to Carlyle. 'At that time', he wrote,

> Tyndall and I had long been zealous students of Carlyle's works. *Sartor Resartus* and the *Miscellanies* were among the few books devoured … by myself … during the cruise of the *Rattlesnake*; and my sense of obligation to their author was … extremely strong. Tyndall's appreciation of the seer of Chelsea [Carlyle] was even more enthusiastic; and, in after-years, assumed a character of almost filial devotion.[82]

While Tyndall viewed Carlyle primarily as a 'great teacher', Huxley valued him chiefly as a 'source of intellectual invigoration and moral stimulus and refreshment'. He seemed to offer a blueprint for a truly masculine science. '[P]assing from the current platitudes to Carlyle's vigorous pages', Huxley declared, 'was like being transported from the stucco, pavement, and fog of a London street to one of his own breezy moors … oh, the freshness and the freedom of it!'[83] Looking back on his early manhood, Huxley recalled 'the bracing wholesome influence of his writings when, as a very young man, I was essaying without rudder or compass to strike out a course for myself'.[84] In a letter to Charles Kingsley written in 1860, he credited Carlyle with rescuing his moral character and reputation amidst a dissolute youth:

> Kicked into the world a boy without guide or training … I confess to my shame that few men have drunk deeper of all kinds of sin than I. Happily, my course was arrested in time … and for long years I have been slowly and painfully climbing … towards better things. And when I look back, what do I find to have been the agents of my redemption? The hope of immortality or of future reward? I can honestly say that for these fourteen years such a consideration has not entered my head. No, I can tell you exactly what has been at work. *Sartor Resartus* led me to know that a deep sense of religion was compatible with the entire absence of theology.[85]

Huxley's account of Tyndall's character, moreover, seems to capture the essence of the Carlylean hero: 'Tyndall was … above all things, sincere; the necessity of doing, at all hazards, that which he judged … to be just and proper, was the dominant note of his character.'[86] For his own part, Tyndall credited Carlyle with teaching him what true manliness was. 'I must ever gratefully remember', he wrote,

> that through three long cold German winters Carlyle placed me in my tub, even when ice was on its surface, at five o'clock every morning—not slavishly, but cheerfully, meeting each day's studies with a resolute will, determined whether victor or vanquished not to shrink from difficulty.[87]

Significantly, Tyndall expressed his gratitude to the American writer and philosopher Ralph Waldo Emerson, together with Carlyle. Without these two men, he declared, 'I never should have become a physical investigator … They told me what I ought to do in a way that caused me to do it, and all my consequent intellectual action is to be traced to this purely moral source.'[88] Emerson and Carlyle were close friends who had known each other intimately since the early 1830s.[89] Their writings, particularly on the role of the scholar and man of science, shared important similarities. The year after the publication of *Sartor* in 1837, Emerson penned a portrait of the ideal scholar remarkably similar to Carlyle's vision of the man of science:[90] 'There goes in the world a notion', wrote Emerson,

> that the scholar should be a recluse, a valetudinarian—as unfit for any handiwork or public labor … The so-called 'practical men' sneer at speculative men, as if because they speculate or *see*, they could do nothing … Action is with the scholar subordinate, but it is essential. Without it, he is not yet man. Without it, thought can never ripen into truth … Inaction is cowardice, but there can be no scholar without the heroic mind.[91]

Another close associate of the X-Club who publicly acknowledged his debt to Carlyle was Francis Galton. In 1874, he published his *English Men of Science: Their Nature and Nurture* which comprised the results of a written questionnaire he had sent to approximately 180 prominent scientists inquiring about their upbringing, family circumstances and character.[92] Its aim was to determine to what extent heredity as opposed to material and cultural conditions during childhood was responsible for shaping the successful man of science. At the end of his introduction, Galton cited a substantial passage from *Sartor Resartus*, claiming that 'it expresses sentiments so nearly akin

to those which induced me to write this book'.[93] Moreover, when we read Galton's conclusions about the typical character of the man of science, as compared with other men, the similarities to Carlyle's ideal are striking. 'As regards the scientific men', he wrote, 'I find, as I had expected, vanity to be at a minimum, and their returns to bear all the marks of a cool and careful self-analysis.' They are, he declared, 'especially manly, honest, and truthful'.[94] This last phrase encapsulates precisely the vision of the scientific gentleman which the X-Club and their friends sought to promote.

Character, Educational Reform and the Man of Science

The X-Club has long been seen as predominantly concerned with a desire to professionalize science;[95] more recently, historians like Ruth Barton have questioned this interpretation. In her work on the Club, Barton has argued that the dichotomy of amateur–professional meant relatively little to leading scientists of the mid-Victorian era and presents something of a false target for historians.[96] The most common phrase used to designate a male scientist was 'man of science' or 'scientific man', both of which, she shows, 'emphasized the nature of the person rather than the activity undertaken' and 'alluded to the qualities of mind and character supposedly needed for and formed by the practice of science'.[97] The phrase 'man of science', although in regular use since the Enlightenment, came, under the influence of the scientific naturalists in the middle years of the nineteenth century, to designate a particular masculine ideal of the scientist. Barton acknowledges that the phrase possessed gendered implications but does not pursue this aspect further.[98] She does, however, offer some important hints, suggesting, for example, that the active–inactive binary is more helpful for understanding the construction of the X-Club's ideal scientist.[99]

If we look, moreover, at the ways in which the term 'professional' was used by scientists in the mid-Victorian period, we see that it was rarely, if ever, employed to describe a process of 'professionalization' in the modern sense. It was never consistently used to refer to individuals' occupational statuses, to indicate whether or not they held a salaried position. Most commonly, it was used to describe a member of the learned 'professions' (law, medicine and the church). Less frequently, it was deployed to designate the kind of qualities, intellectual and moral, that the ideal man of science might be expected to possess: independence, dedication, self-discipline and endurance—what we might term a 'professional' character.[100] Seen

in this way, the dichotomy maintained by Ruth Barton, between 'professionalization', as a socio-economic process, on the one hand, and 'identity formation' on the other, begins to break down.[101]

At the height of their influence, the X-Club worked hard to institutionalize their reconstituted vision of the scientific-gentleman through reform of the British education system. Huxley took the lead in this. From his appointment as Professor at the School of Mines in 1854, he argued consistently before a variety of audiences including the British Association, the Royal Institution, schoolteachers and government representatives, for the value of science as a training in moral and intellectual character. While lecturing at the School of Mines, he 'consistently subordinated the practical value of science to its moral and intellectual value'.[102] In a lecture before the Royal Institution entitled 'On Natural History as Knowledge, Discipline, and Power', given in February 1856, Huxley argued that science is best understood as a 'moral discipline' demanding 'courage, patience, and self-denial' of the practitioner.[103] It is 'character and not talent', he declared, 'which is the essential element of success in science', above all, the cultivation of 'earnest truthfulness'.[104] Passing over the practical and economic benefits of scientific research, he stressed, echoing Carlyle, that '[s]trength—capacity of action and of endurance—is the highest thing to be desired; and this is to be obtained only by a careful disciplining of all the faculties, by that training which the pursuit of science is, above all things, most competent to give.'[105]

At a meeting of the General Council of the BAAS in November 1866, a special committee was established to inquire into the best means of introducing science education into schools. Both Huxley and Tyndall were members. When the committee reported a year later to the Association's annual meeting in Dundee, their influence was clear to see. Once more, it was science's unique potential as a mental and moral training, rather than its practical, technical and economic importance which was the focus of attention. The committee's aim, the report makes clear, was the 'recognition of Science as an element in liberal education'.[106] In a list of reasons why scientific instruction should be greatly increased in schools, 'grounds of practical utility' came right at the end.[107] Thus, when recommending the introduction of 'Experimental Physics', the report stressed that 'it exercises the attention and the memory, but makes both of them subservient to an intellectual discipline higher than either'.[108] While the dominant system of classical education 'failed deplorably for the majority of minds'[109] and produced 'astonishing ignorance',[110] science

> brings into healthful and vigorous play every faculty of the learner's mind. Not only are natural phenomena made the objects of intelligent observation, but they furnish material for thought to wrestle with and to overcome, the growth of intellectual strength being the sure concomitant of the enjoyment of intellectual victory.

In this context, science has the potential to become 'an instrument of mental training of exceeding power'.[111]

Yet, for this to happen, science had not simply to be taught to boys in schools; it had to be taught in such a way as to promote 'the scientific habit of mind'. 'There is an important distinction', the report declared, 'between scientific *information* and scientific *training*, in other words, between general literary acquaintance with scientific facts and the knowledge of methods that may be gained by studying the facts and first hand under the guidance of a competent teacher.'[112] In an article for *Macmillan's Magazine*, entitled 'A Liberal Education and Where to Find It', published in 1868, Huxley drew a sharply gendered contrast between the dominant system of classical education, dismissed by him elsewhere as a 'thrawldom of words',[113] and scientific instruction, which he saw as the foundation of a manly character.[114] In characterizing the study of literature as a 'source of pleasure without alloy' and a 'serene resting place for worn human nature', Huxley was, as Paul White has shown, 'drawing on an extensive Victorian discourse which feminized and domesticated fiction'.[115] These phrases, moreover, remind us strongly of Huxley's own description of the ideal wife in letters to his fiancée, Henrietta Heathorn, much earlier in his career. In letters of February 1848, for example, he declares: 'She is that living ideal of goodness before his eyes … When one is sick of the world, of its petty intrigues, its lesser and greater selfishness and dirt eating.'[116]

In the BAAS report, the committee was primarily addressing the question of science education in the private schools of the middle and upper classes. It is significant, however, that in Huxley's later work as a member of the London School Board (from 1871 onwards), helping to design the curriculum for England's first national elementary school system, he advocated science lessons for the poorest children also as the best possible training for moral and intellectual character. This was, in part, a response to the 1871 report of the Science and Art Department, which had argued that science education's primary role was in extending science's commercial and industrial value.[117] Rather, Huxley stressed, in a speech to the London School Board in February 1871, that the chief aim would be

'the implanting in the minds of children and giving them reasons for the great laws of conduct in the world, and the primary one of religion and morality'. Two of his colleagues on the Board, Dr Alfred Barry, principal of King's College, London, and Benjamin Waugh, a Congregational Minister at Greenwich, would later praise Huxley's 'singular candour' and the 'lofty ideals' with which he invested elementary science education.[118]

The next significant step in the development of science education in a British context was the 1870 Royal Commission on Scientific Instruction and the Advancement of Science. As Roy McLeod has pointed out, the inclusion of the BAAS's name in the title of the Commission was 'not accidental'.[119] Indeed, it reflected the substantial impact of the 1867 report produced by the Association's Committee on Scientific Instruction, dominated by Huxley and Tyndall, but also the subsequent work of Huxley on the London School Board and the broader campaign of the X-Club for improvements in science education. Two members of the club—Huxley and Lubbock—were appointed as Commissioners and three others—Edward Frankland, Joseph Hooker and William Spottiswoode—were called to give evidence before it.

The influence of the X-Club members and their vision of the moral and hard-working gentleman-scientist, was clear to see in the reports and evidence published by the 1870 Commission. Particularly important was the distinction repeatedly made by Huxley during his career between active 'workers in science' and those with mere 'book knowledge'.[120] For Huxley and the other members of the X-Club, opposed as they were to aristocratic influence in science, traditional classical education was condemned as passive and elitist. Teaching by books without active experimentation was repeatedly condemned in the Commission's reports as stifling manly independence of thought, similar to the effect of undue aristocratic patronage in science. According to the evidence given to the Commission by John Phillips, Professor of Geology at Oxford, and one of the original founders of the BAAS, children of the industrial middle class who went to read natural sciences at Oxford could 'hardly be regarded in the light of fellow-students' by their classically trained peers.[121] Indeed, they were shunned as uncultivated and unmanly.

Advocates of science like H. J. S. Smith, Savilian Professor of Geometry at Oxford, made similar accusations in their evidence. 'The teaching in the colleges', Smith commented with regard to Oxford and Cambridge, 'is necessarily somewhat of a schoolboy kind … it is kept close to textbooks,

and close to the purposes of the University examinations, and by itself it does not always have a very awakening effect upon the intelligence of young men; it is apt to have something of a "grinding" character.'[122] J. G. Greenwood, a Professor at Owen's College, Manchester, remarked similarly that 'the tendency to call into too exclusive operation one set of mental faculties, the aesthetical side of the mind, for instance; and again the tendency to lean upon authority and tradition, rather than to bring into play the correctives supplied by inductive processes are very strong.'[123]

According to the Commission's findings, the dominance of the literary model of science teaching was also visible in England's public schools, above all in the negative and 'unmanning' effect it was held to have on male pupils. According to Revd. J. H. Rigg, Principal of the Wesleyan Training College, Westminster, there was a 'waste of power and time' in current science teaching in school.[124] Thomas Anderson, president of the Chemical Section of the BAAS in 1867 and Professor of Chemistry at Glasgow agreed. To his mind,

> [t]he difficulty [lay] in the kind of instruction offered; the usual practice having been to give lectures from which the discussion of principles and everything which exercises and develops the mind, is eliminated, and only that which it is supposed will entertain or surprise is retained, and boys are thus led to look upon science merely as a pastime.[125]

By contrast, Fleeming Jenkin, Professor of Civil Engineering at Edinburgh, argued that science education needed to be remodelled in order to produce men 'more capable of doing work'. 'A man who merely hears about work', he declared, 'has no definite idea of what is meant by it.' Learning science should be a process of masculine hardening involving real work in the real world. 'The men who learn are the men who have been brought into contact with the work, who have already felt their ignorance—they get [a] chance of learning, they absorb knowledge with great rapidity.'[126]

Particularly criticized by those giving evidence before the 1870 Commission was the tendency of Britain to train scientists at the same schools and universities as everybody else rather than in specialized institutes in centres of industry. Here, as might be expected, it was the example of German science which was repeatedly drawn on as a model to be emulated. As I. L. Bell, an industrialist involved in lead, iron and coal manufacturing in Northern England, commented:

> There is a class of men I find on the continent almost entirely wanting in England, namely, men of science who have devoted a great portion of their time to questions of applied science … there are scientific men abroad … who not only possess great scientific acquirements, but they devote their scientific knowledge to the careful observation of the operation of the blast furnace, of the manufacture of steel, or of the rolling mill.[127]

In his evidence, Dr Zeuner of Zurich, himself citing Hermann von Helmholtz, repeated the view that a literary approach to science teaching unmanned students and robbed them of their independence—that chief characteristic of a scientist and a man:

> Philological culture has an ill effect on those who are to devote themselves to science, the philologist is too much dependent on the authority of books, he cannot observe for himself, or rely upon his own conclusions, and having only been accustomed to consider the laws of grammar, all of which have their exceptions, he cannot understand the invariable character of physical laws.[128]

Henry Hennessy, Professor of Physics at the Catholic University of Ireland, citing his own 1859 work, *A Discourse on the Study of Science in Relation to Individuals and to Society*, agreed: 'In his practice and profession, a superficial student' (one who had a merely literary acquaintance with scientific facts) 'would soon find the narrow boundaries within which his acquirements could be useful, and he would be constantly overwhelmed with difficulties which his limited stock of ideas and his feeble power of applying them would render him unable to surmount.' Rather than a manly, analytical, independent mind, he would have 'a mind at once so delicate and so voracious'.[129]

It was a logical extension of this argument to suggest that a training in scientific method and experimentation fostered precisely the sort of masculine independence necessary for those who would serve in Britain's empire. The BAAS Committee on Scientific Instruction, led by Huxley and Tyndall, noted in their 1867 report that, where available, science lessons seemed to promote a sense of personal responsibility for character development. Since some public schools such as Rugby and Harrow had introduced systematic scientific instruction, the boys had started to set up their own voluntary Science Associations. 'Th[e]s[e] scientific societ[ies], which number upwards of 30 members', the report described, 'meet every ten days at the house and under the presidency of one or other of

the masters … We cannot too highly recommend the encouragement of such associations for intellectual self-culture among the boys of our public schools.'[130] At the same meeting in Dundee, the BAAS Parliamentary Committee, whose function it was to liaise with and lobby government in the interests of science, reported that such developments were of direct benefit to both nation and empire. The introduction of 'scientific teaching into our [Public] Schools', was a 'necessity', it claimed, 'if we are not willing to sink into a condition of inferiority as regards both intellectual culture and skill in art when compared with foreign nations'.[131]

By contrast, young men whose educations were dominated by the classics or had studied science merely through textbooks could not be expected to develop the necessary courage and independence. In a paper appended to the sixth report of the 1870 Commission, and which had been delivered at the annual meeting of the BAAS in Brighton that year, Revd. E. Hale, an assistant master at Eton, condemned the still dominant 'idea of teaching the pupils their duties as citizens by means of a classical education'. Citizenship, he declared, was an active, masculine duty, which required training in subjects which promoted independent thinking and were connected with the real world. '[B]y enforcing arbitrary rules of (so-called) grammar', he told the Commission, 'and by exercises in a forced and artificial style of composition', the current system of classical education 'is calculated to dwarf the mind and impair the reasoning faculty … preventing freedom of thought or play of intellect'. While classically trained pupils might complete their education knowing 'the political divisions of the world in the days of the supremacy of Greece and Rome', they were often 'absolutely ignorant of the commonest geographical facts' in the nineteenth century, including Britain's imperial responsibilities.[132]

At the 1867 BAAS meeting at Dundee, the meeting which received the report from Huxley, Tyndall and the other members of the Committee on Scientific Instruction, Samuel Baker, president of the Geographical and Ethnological Section, reflected on the important contribution of men of science to the development of imperial masculinity. In a 'wonderful train of progression', he declared, 'the missionary and the explorer have united in patiently boring their way through lands that have lain hidden since the world's creation'.[133] Speaking of the scientist and explorer, David Livingstone who, many thought, had at that time been killed in Africa, Baker pronounced: 'There are many as brave, many as adventurous; but there are few who combine the qualifications of patience and endurance that are so sorely needed in that most difficult of all thorny paths, "African

research".' He then referred to himself and other men of science currently working in Africa as 'brave and daring explorers'. 'The advancement of science', he concluded, has done so much to 'practically augment the power [of the British Empire] to civilize'.[134]

As early as 1846, Huxley's friend, and promoter of 'muscular Christianity', Charles Kingsley, had argued that practically oriented instruction in science was the perfect method for training the manly heroes of empire. In a popular evening lecture to a mixed audience in Reading, on the subject 'How to Study Natural History', Kingsley argued that science, taught systematically, helped pupils to 'face facts manfully, to discriminate between them skilfully, to draw conclusions from them rigidly'.[135] He expressed his concern that Britain would fall behind her rivals for want of 'a steady and severe training' which would enable boys 'to judge dispassionately of facts'.[136] Against the 'extravagances' and 'loose sentimental tone of mind' which characterized contemporary classical education, 'hardly anything would be a better safeguard', he argued, 'than the habitual study of nature'.[137] Tying a scientific training firmly to national and imperial masculinity, Kingsley declared that it fostered the 'habit of mind which God has … ordained for Englishmen' and facilitated 'the glorious work which God seems to have laid on the English race, to replenish the earth and subdue it'.[138]

Kingsley pursued this line of thinking further in his 1855, *Glaucus, or, The Wonders of the Shore*, where he tells his reader: 'This age offers no more wholesome training, both moral and intellectual, than that which is given by instilling into the young an early taste for out-door physical science.'[139] While book learning may have its advantages for young men it never did make 'originators of daring schemes' such as those needed in the empire.[140] 'A frightful majority of our middle class young men are growing up effeminate', Kingsley declared, 'thinkers and readers', who cultivate 'with unwholesome energy, the head at the expense of the body and the heart'.[141] A young man educated in such a way, 'will cut but a sorry figure in Australia, Canada, or India', he concluded.[142] As colonial life was lived largely outside in the fresh air, the reclusive life of the scholar, passed primarily in reading and writing books, was completely the wrong approach to take in preparing young men for imperial service. When he praised scientific instruction in schools, Kingsley made clear that he did not mean the practices of 'mere classification, and the finding out of names … too common, alas! among mere closet-collectors'. It is not, he continued, for 'these pedantries, for which we have been lauding the study of Natural

History: but in healthful walks and voyages out of doors … and a temper calmed by the continual practice of the naturalists' first virtues—patience and perseverance'.[143] Indeed, it was Darwin's *Voyage of the Beagle and Adventure* which he thought 'ought to be in the hands of every lad who is likely to travel to our colonies'.[144]

With the emergence of a new generation of British scientists who came to prominence in the 1840s and 1850s, we see the development of a very different ideal of the man of science. While Huxley, Tyndall and the other members of the X-Club chose to retain the language of the scientific gentleman, we should not let that blind us to the very real differences between the vision of the scientist they put forward and the aristocratic gentleman-scientist favoured by the BAAS in the 1830s. For Huxley and his friends, the gentleman carried a radically different meaning; his nobility was not of birth or wealth, but of moral character. Reflecting the broader cultural shift away from a strictly hierarchical society, structured by rank and deference, the new gentleman-scientist was defined by his gentlemanly character—by his humility, sincerity and self-discipline and, above all, by what he gave back to society.

Notes

1. [Bowden], 'The British Association for the Advancement of Science', pp. 15, 14.
2. Ibid., p. 17.
3. Ibid., pp. 16–17.
4. Ibid., p. 15.
5. Ibid., p. 17.
6. Ibid., p. 13.
7. Ibid., p. 8.
8. John Henry Newman to Mrs J. Mozley (23 April 1839) in Ian Ker, Thomas Gornall and Charles Dessain eds., *The Letters and Diaries of John Henry Newman* Vol. 7 (London: T. Nelson, 1961), p. 66.
9. James Anthony Froude, *Short Studies on Great Subjects* Vol. 4 (London: Longmans, Green and Co., 1899), p. 281.
10. Adams, *Dandies and Desert Saints*, p. 6.
11. Carlyle, *On Heroes*, p. 185.
12. Ibid, p. 211.
13. Ibid., p. 184.

14. Ibid., p. 184.
15. Ibid., p. 184.
16. Ibid., p. 220.
17. Thomas Carlyle to John A. Carlyle (24 June 1824), *Carlyle Letters* vol. 3, pp. 90–91, cited in Norma Clarke, 'Strenuous Idleness: Thomas Carlyle and the Man of Letters as Hero' in John Tosh and Michael Roper eds., *Manful Assertions: Masculinities in Britain since 1800* (London: Routledge, 1991), p. 29.
18. Thomas Carlyle to Jane Baillie Welsh (20 December 1824) in *Carlyle Letters* vol. 3, p. 234. Cited in Clarke, 'Thomas Carlyle and the Man of Letters as Hero', p. 35.
19. Thomas Carlyle, 'James Carlyle' (January 1832) in J.A. Froude ed., *Reminiscences* (New York: Harper and Brothers, 1881), p. 9.
20. Clarke, 'Thomas Carlyle and the Man of Letters as Hero', p. 38.
21. Thomas Hope, *An Essay on the Origin and Prospects of Man* Vol. I (London: John Murray, 1831), p. 35.
22. Thomas Carlyle, *Characteristics* in ed., G.B. Tennyson, *A Carlyle Reader* (Cambridge: Cambridge University Press, 1984), p. 97.
23. Ibid., p. 89.
24. Ibid., p. 90.
25. Ibid., p. 89.
26. Ibid., p. 90.
27. Carlyle, *On Heroes*, p. 149.
28. Ibid., p. 185.
29. Carlyle, *Characteristics* in ed., Tennyson, *A Carlyle Reader*, pp. 81–82.
30. Ibid., p. 97.
31. John Orbell, 'Hope, Thomas (1769–1831)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edn, Jan. 2008 [http://www.oxforddnb.com/view/article/13737, accessed 26 April 2016].
32. Carlyle, *Characteristics* in ed., Tennyson, *A Carlyle Reader*, pp. 98–99.
33. Many historians, however, continue to interpret Carlyle as resolutely hostile to science. See, for example, Ruth Barton, '"Huxley, Lubbock, and Half a Dozen Others": Professionals and Gentlemen in the Formation of the X-Club, 1851–1864', *Isis* 89:3 (September 1998), p. 418. James Secord makes the right distinction when he sees Carlyle rather as condemning attempts to 'discover meaning

through a narrowly conceived physical science'. 'All such efforts', he writes, are dismissed by Carlyle as 'variants of a barren utilitarianism, written in a mechanical style to be read in a mechanical way'. Secord, *Visions of Science*, p. 207.

34. Carlyle, *Characteristics* in ed., Tennyson, *A Carlyle Reader*, p. 98.
35. Ibid., p. 98.
36. [Bowden], 'The British Association for the Advancement of Science', p. 14.
37. Carlyle, *Characteristics* in ed., Tennyson, *A Carlyle Reader*, p. 99.
38. Ibid., p. 98.
39. Ibid., p. 94.
40. Carlyle, *On Heroes,* p. 212.
41. Carlyle, *Characteristics* in ed., Tennyson, *A Carlyle Reader*, p. 101.
42. Tosh, 'Gentlemanly Politeness and Manly Simplicity', p. 455.
43. Adams, *Dandies and Desert Saints*, pp. 16; 108.
44. Tosh, 'Gentlemanly Politeness and Manly Simplicity', p. 458.
45. Carlyle, *Characteristics* in ed., Tennyson, *A Carlyle Reader*, p. 91.
46. Adams, *Dandies and Desert Saints*, p. 4.
47. Ibid., p. 7. John Tosh, however, has argued that a new ideal of 'manliness', characterized by a 'rugged individualism', rather than 'gentlemanliness' became the dominant model of masculinity among the emerging industrial middle classes in the early and mid-Victorian period. See Tosh, 'Gentlemanly Politeness and Manly Simplicity', p. 457.
48. Tosh, 'Gentlemanly Politeness and Manly Simplicity', p. 457.
49. See, for example, Carlyle, *Characteristics* in Tennyson ed., *A Carlyle Reader*, p. 97.
50. J.H. Bennett,' Biography of the Late Professor Edward Forbes', *Monthly Journal of Medicine* 20 (1855), p. 83.
51. George Wilson and Archibald Geikie, *Memoir of Edward Forbes* (London: Macmillan and Co., 1861), p. 247.
52. Daniel Brown, *The Poetry of Victorian Scientists: Style, Science and Nonsense* (Cambridge: Cambridge University Press, 2013), p. 91.
53. Brian G. Gardiner, 'Edward Forbes, Richard Owen and the Red Lions', *Archives of Natural History* 20:3 (1993), p. 349.
54. Adam Sedgwick to Mrs Lyell (16 October 1837), cited in Morrell and Thackray, *Gentlemen of Science: Early Years of the BAAS*, p. 113.

55. T.H. Huxley, 'Professor Tyndall', *The Nineteenth Century: A Monthly Review* 35:203 (January 1894), pp. 5–6.
56. Ruth Barton, '"Huxley, Lubbock, and Half a Dozen Others"', p. 427.
57. See, for example, White, *Thomas Huxley*, pp. 45, 60, 64.
58. Edward Forbes, 'A Yawn from a Red Lion' (1851), cited in Gardiner, 'Edward Forbes, Richard Owen, and the Red Lions', p. 354.
59. Forbes, 'A Yawn from a Red Lion', p. 357.
60. For this shift away from 'gentlemanly politeness', see Tosh, 'Gentlemanly Politeness and Manly Simplicity'. Other historians such as Gillian Williamson have located this shift earlier—in the mid to late eighteenth century. See Williamson, *British Masculinity in the 'Gentleman's Magazine', 1731–1815*, p. 7. Tosh, too, discusses the idea that the roots of this shift away from politeness lay much earlier in the eighteenth century. See Tosh, 'Gentlemanly Politeness and Manly Simplicity', p. 461. On politeness, see Philip Carter, *Men and the Emergence of Polite Society, Britain 1660–1800* (London: Routledge, 2001); Michèle Cohen, '"Manners Make the Man": Politeness, Chiavalry and the Construction of Masculinity, 1750–1830', *Journal of British Studies* 44:2 (2005), pp. 312–329.
61. Forbes, 'A Yawn from a Red Lion', p. 356.
62. Brown, *The Poetry of Victorian Scientists*, p. 93.
63. On the X-Club and professionalization, see, for example, Frank Turner, 'The Victorian Conflict Between Science and Religion: A Professional Dimension' in Frank Turner, *Contesting Cultural Authority: Essays on Victorian Intellectual Life* (Cambridge: Cambridge University Press, 1993), pp. 180–183.
64. James R. Moore, 'Theodicy and Society: The Crisis of the Intelligentsia,' in Richard J. Helmstadter and Bernard Lightman eds., *Victorian Faith in Crisis: Essays on Continuity and Change in Nineteenth-Century Religious Belief* (Basingstoke: Macmillan, 1990), p. 172.
65. Barton, '"Huxley, Lubbock, and Half a Dozen Others"', p. 412.
66. Ruth Barton, '"An Influential Set of Chaps": The X-Club and Royal Society Politics, 1864–85', *The British Journal for the History of Science* 23:1 (March 1990), p. 58.

67. Huxley, 'Professor Tyndall', p. 6. In a letter of 1895 to Tyndall's widow, Louisa, Hooker also claims that Tyndall, Huxley and himself first became friends at the BAAS meeting at Ipswich in 1851. Ruth Barton has challenged the truth of this claim, however, maintaining that this letter is the only evidence for 1851 being the date when the three future X-Club members became friends and that contemporary letters do not support this date. See Barton, '"Huxley, Lubbock, and Half a Dozen Others"', p. 419, n. 21. However, the passage from Huxley's posthumous record of Tyndall's life, cited here, confirms the date of 1851 for the beginning of their friendship.
68. Gardiner, 'Edward Forbes, Richard Owen and the Red Lions', p. 372.
69. 'Social Science', *Blackwood's Edinburgh Magazine* 90:552 (October 1861) p. 473.
70. Thomas Archer Hirst, Journal (21 January 1854), cited in Hannah Gay and John W. Gay, 'Brothers in Science', pp. 432–433.
71. On the 'X-Network', see Barton, '"Huxley, Lubbock, and Half a Dozen Others"', p. 416.
72. Gay and Gay, 'Brothers in Science', p. 430.
73. Wilson and Geikie, *Memoir of Edward Forbes*, p. 188.
74. Hirst, Journal (21 January 1854), cited in Gay and Gay, 'Brothers in Science', p. 433.
75. Secord, *Visions of Science*, p. 233.
76. Ibid., p. 235.
77. See Frank Turner, 'Victorian Scientific Naturalism and Thomas Carlyle' in Turner, *Contesting Cultural Authority*, pp. 131–150.
78. Thomas Huxley to Charles Kingsley (23 September 1860) in Leonard Huxley, *Life and Letters of Thomas Huxley* Vol. I (London: Macmillan and Company, 1913), p. 238.
79. Turner, 'Victorian Scientific Naturalism and Thomas Carlyle', p. 135.
80. John Morley, *Critical Miscellanies* (London: Chapman and Hall, 1871), p. 206.
81. Turner, 'Victorian Scientific Naturalism and Thomas Carlyle', p. 137.
82. Huxley, 'Professor Tyndall', p. 3.
83. Ibid., p. 3.

84. Leonard Huxley, *Life and Letters of Thomas Huxley*, Vol. II (London: Macmillan and Co., 1900), p. 310.
85. Ibid., p. 318.
86. Huxley, 'Professor Tyndall', p. 4.
87. John Tyndall, *Fragments of Science for Unscientific People: A Series of Detached Essays, Lectures, and Reviews* (New York: D. Appleton and Company, 1871), p. 102.
88. Tyndall, *Fragments of Science*, p. 102.
89. Carlyle and Emerson recognized the strong similarities in each other's work, particularly, in their ideals of masculinity. Upon receiving a copy of Emerson's *English Traits* (1856), Carlyle wrote to his friend, praising him as 'a real *man*, with eyes in his head; nobleness, wisdom, humour and many other things in the heart of him'. Thomas Carlyle to Ralph Waldo Emerson (2 December 1856) in Brent E. Kinser ed., *The Carlyle Letters Online* (Duke University Press, 14 September 2007) http://carlyleletters.dukeupress.edu//online_project [Last accessed 18 April 2016].
90. This is most clearly given in Carlyle, *Sartor Resartus*, pp. 67–68.
91. Ralph Waldo Emerson, 'The American Scholar' (1837) in David Mikics ed., *The Annotated Emerson: Ralph Waldo Emerson* (London: Harvard University Press, 2012), p. 80.
92. Francis Galton, *English Men of Science: Their Nature and Nurture* (New York: D. Appleton and Company, 1875).
93. Ibid., p. viii.
94. Ibid., p. 111.
95. This is the view most famously put forward by Frank Turner. For a collection of Turner's work on scientific naturalism, see, Frank Turner, *Contesting Cultural Authority*.
96. Ruth Barton, 'Men of Science', p. 73. For more of her work on the X-Club, see Barton, '"Huxley, Lubbock, and Half a Dozen Others"'; Barton, '"An Influential Set of Chaps"'.
97. Barton, 'Men of Science', p. 81.
98. Ibid., p. 90.
99. Ibid., p. 84.
100. For this use of the term 'professional', see Barton, 'Men of Science', pp. 94–95.
101. For Barton's opposition of 'professionalization' and 'identity formation', see Barton, 'Men of Science', p. 80.

102. White, *Thomas Huxley*, p. 77.
103. T.H. Huxley, 'On Natural History as Knowledge, Discipline, and Power' in Michael Foster and E. Ray Lankester eds., *The Scientific Memoirs of Thomas Henry Huxley*, Vol. 1 (London: Macmillan and Co., 1898), p. 313. Cited in White, *Thomas Huxley*, p. 78.
104. Huxley, 'On Natural History as Knowledge, Discipline, and Power', p. 313.
105. Ibid., p. 305.
106. *On the Best Means for Promoting Scientific Education in Schools; A Report Presented to the General Committee of the British Association for the Advancement of Science at Dundee, 1867* (London: John Murray, 1868), p. 9.
107. Ibid., p. 10.
108. Ibid., p. 14.
109. Ibid., p. 11.
110. Ibid., p. 12.
111. Ibid., p. 15.
112. Ibid., p. 13.
113. White, *Thomas Huxley*, p. 79.
114. [T.H. Huxley], 'A Liberal Education and Where to Find It', *Macmillan's Magazine* 17 (1867), 367–378.
115. White, *Thomas Huxley*, p. 79.
116. Thomas Huxley to Henrietta Heathorn (6 and 15 February 1848), cited in White, *Thomas Huxley*, p. 19. We should, however, remember that this 'feminization' of literature and classics by associating them with feminine domesticity was ambiguous as elsewhere Huxley used similar metaphors to describe the advantages of scientific research. See p. 6.
117. *Parliamentary Papers* (1871), volume 24, pp. xxviii–xxix.
118. Leonard Huxley, *Life and Letters of Thomas Huxley* Vol. I, pp. 377; 364.
119. MacLeod, 'Introduction' in MacLeod and Collins eds., *Parliament of Science*, p. 28.
120. See, for example, T. H. Huxley, *Science and Education: Essays* (New York: J.A. Hill and Company, 1904), p. 113.
121. *Royal Commission on Scientific Instruction and the Advancement of Science Vol. I* (London: George Edward Eyre and William Spottiswoode, 1872), p. 202.
122. Ibid., p. 220.

123. Ibid., p. 475.
124. Ibid., p. 552.
125. *Report of the Thirty-Seventh Meeting of the British Association for the Advancement of Science*, p. 31.
126. *Royal Commission on Scientific Instruction and the Advancement of Science Vol. I*, p. 94.
127. Ibid., p. 623.
128. Ibid., p. 507.
129. *Royal Commission on Scientific Instruction and the Advancement of Science Vol. II* (George Edward Eyre and William Spottiswoode, 1874), p. 26.
130. *On the Best Means for Promoting Scientific Education in Schools*, pp. 39–40.
131. *Report of the Thirty-Seventh Meeting of the British Association*, p. lx.
132. *Sixth Report of the Royal Commission on Scientific Instruction and Advancement of Science* (London: George Edward Eyre and William Spottiswoode, 1875), pp. 71–72.
133. *Report of the Thirty-Seventh Meeting of the British Association*, p. 105.
134. Ibid., p. 110.
135. Charles Kingsley, *Miscellanies* Vol. 2 (London: John W. Parker and Son, 1860), p. 348.
136. Ibid., p. 350.
137. Ibid., p. 352.
138. Ibid., p. 364.
139. Charles Kingsley, *Glaucus: Or, The Wonders of the Shore* (Cambridge: Macmillan and Co.), p. 43.
140. Ibid., p. 45.
141. Ibid., pp. 45–46.
142. Ibid., p. 48.
143. Ibid., p. 145.
144. Ibid., p. 163.

CHAPTER 6

The Decline of the British Association? Marginalization, Masculinity and Marconi

In general, historians of the BAAS have viewed the period covered in Chapter 5, between 1840 and 1865 as 'a period of consolidation, in which the Association survived criticism and grew in public stature'.[1] This impression was due in no small part to the efforts of the Red Lions Club and the broader network of scientific naturalists who came to prominence in these years. They played a vital part in helping to turn around the public image of science, imbuing it with a more serious tone. Contemporaries, too, noted the change. Looking back from the vantage point of 1855, Charles Kingsley wrote of 'the contempt in which the naturalist was held' just 'two generations since'. He had been seen, Kingsley claimed, as 'a harmless enthusiast' who went 'bug-hunting … because he had not the spirit to follow a fox!'[2] The transformation which had taken place by 1855 was considerable. '[G]radually', Kingsley wrote, 'the whole choir of cosmical sciences have acquired a soundness, severity, and fullness, which render them … as valuable to a manly mind as Mathematics and Metaphysics.'[3] Likewise, David Brewster, in an article for the *North British Review*, written to celebrate twenty years of the BAAS, argued that the peace-loving character of the man of science represented the ideal manhood for modern times.[4] Reflecting the considerable impact of Carlyle's writings upon the self-construction of men of science in the intervening years, Brewster invoked a very different masculine ideal for the British Association in 1850 than the aristocratic gentleman of twenty years before. The BAAS now celebrated 'the procession of the intellectual hero'. As the Association 'enter[ed] the year of its manhood', he declared, it 'may now be regarded

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
DOI 10.1057/978-1-137-31174-0_6

as a permanent institution for the advancement of science to which all others have yielded a willing supremacy.'[5]

And yet, despite the more confident tone, Brewster's article reveals that the masculine authority of science, even at mid-century, was still not acknowledged by all. He drew attention, in particular, to the government's continued failure to grant sufficient public recognition and rewards to men of science. Indeed, he claimed that the situation had improved little from the year of the BAAS's foundation. '*[D]eeply is it to be lamented*', he wrote, citing John Paris's, *Life of Sir Humphry Davy*, published in 1831,

> *that the disproportioned exaltation of military achievement … depresses respect for science, and raises a false and fruitless object of ambition.* The passion for arms is a relic of barbarity … the progress of civilization, and the cultivation of the mind should have led us to prefer intellectual to physical superiority, and to recognise in the successes of science the chief titles to honour.[6]

Later in the same article, Brewster argued that men of science were a match for soldiers in their bravery, tactical thinking and ability to withstand physical suffering: 'Has science no strongholds to storm', he asked,

> —no mines to spring—no nightly bivouac to endure—no casualties in her bills of mortality—no forlorn hope to array for the combat? Do her ranks exhibit no emaciated frames—no shattered limbs—no mutilated senses—no overwrought and distracted minds—no scanty commissariat—no widows and orphans? The biography of science, were it necessary, would enable us to answer these questions with numerous and distressing details.[7]

Here, scientific work is shown not simply as the intellectual equivalent of physical valour on the battlefield; it is equal also in terms of the physical deprivation and sufferings it requires, sufferings made considerably worse, Brewster maintained, by the lack of official recognition for Britain's men of science. Whether judged on their own terms, or on those of the country's military heroes, scientific practitioners were 'the men whose talents … constitute [Britain's] true glory and surest defence'.[8] In Brewster's treatment, the physical and emotional suffering of men of science is recast as a form of ascetic masculinity, reminiscent of Carlyle's self-disciplined and suffering hero. Living a reclusive life away from the world is no longer taken as a sign of the inferiority or effeminacy of scientists, but rather as a token of their masculine strength and endurance. Yet, despite the fact that the rising generation of scientists were pioneering a discourse which

allowed the BAAS to exalt the 'intellectual hero' over the aristocratic dilettante, his masculine status was still not secure. Brewster's claim that the scientific life was a valid form of masculinity still had to be justified with reference to traditional forms of elite (military) manhood.

Nor did the situation alter drastically with the heyday of the X-Club. James Eli Adams has argued that Carlyle's choice to emphasize self-discipline in his ideal of heroism was distinctly ambiguous in a gendered sense. Despite Carlyle's clear preference for action over inaction,[9] Adams noticed that for some Victorian commentators, especially in the second half of the century, his focus on self-control and renunciation actually 'perplexe[d] the binaries of active and passive, of self-assertion and self-denial'. '[T]ributes to it [Carlylean manhood]', he wrote, 'frequently confound traditional assignments of gender'.[10] In his biography of Huxley, Paul White makes a similar point about the man of science in general, claiming that 'his … identity … rest[ed] on a conflation of separate spheres, and of masculine and feminine agencies'.[11] At the heart of this claim was the fact that the type of scientist represented by the scientific naturalists and the X-Club still often worked in a semi-reclusive state, away from the world—frequently even within an explicitly domestic context. Charles Darwin, often described as the X-Club's ideal man of science, worked exclusively from his home at Down, rarely entering society. As White has argued, in contemporary portraits Darwin appeared 'virtually as a disembodied thinker, withdrawn from the world, and at work in a domestic sanctum'.[12] In spite of his success, Huxley worried throughout his career that his character was not sufficiently masculine. As he wrote to his sister while still aboard the Rattlesnake in 1850:

> I have a woman's element in me. I hate the incessant struggle and toil to cut one another's throat among us men, and I long to be able to meet with some one in whom I can place implicit confidence … who will not laugh at my most foolish weaknesses, and in whose love I can forget all care.[13]

Huxley, moreover, frequently drew parallels between his scientific work and home life in terms of the escape from the busy, male-dominated world it provided. Writing to his future wife, Henrietta Heathorn, in July 1851, he argued that

> No woman who knows her true interests will ever begrudge the time her husband gives to … Science or Art. They are her best allies, for they … require earnestness and faith and fixity of purpose for their successful culti-

> vation. In this pure sphere, the soul sickened and sceptical from intercourse with men meets truth face to face … It returns to the world purified and thence fitter to recognize the good in all shapes, fitter therefore to love, for that means to recognize purity and goodness.[14]

John Tyndall, likewise, did not enjoy an unalloyed masculine reputation. Some contemporary commentators certainly considered him a hero of modern science—in 1872, *Vanity Fair* featured him in their 'Men of the Day' series, declaring 'Science is before long to rule the world and Mr. Tyndall is one of the pioneers of its kingdom.'[15] Yet the same writer in *Vanity Fair* stressed that Tyndall was valued as a 'man of muscle, and a man of imagination, and a man of conversation almost as much as a man of science'. Indeed, he wrote, 'it is these three gifts [muscle, imagination and conversation] by which he is appreciated in unscientific circles, and at the hands of society at large'.[16] While positive in its overall assessment of Tyndall, the *Vanity Fair* portrait clearly separates his role as 'man of science' from those qualities which establish his masculine reputation, leaving a question mark over science as a manly pursuit.

Moreover, despite his position as a member of the X-Club and the successful reorienting of science away from aristocratic culture, Tyndall was frequently subject to gendered attacks which labelled him effeminate and foppish. Like Davy before him, it was his popular lectures at the Royal Institution which primarily gave rise to such criticism. His lectures were condemned for their 'artificiality' and 'theatricality'.[17] He was accused of acting a part to please an audience, of being 'an eidolon, or counterfeit—… a humbug'.[18] In many respects, the tone had changed little from the attacks made on Davy in the 1820s.[19] Tyndall's ability to attract large female audiences, for example, was a particular focus for his critics. They condemned his 'scatter-brained auditors who dabble in science out of shifting caprice, or in deference to the dictates of fashion … It is to accommodate such feeble votaries that "popular science" has been invented', they declared.[20] Other articles attacked Tyndall as part of a wider trend, disapprovingly termed 'sensational science', whose lecturers were accused of an 'ostentatious display of devotion to science'.[21] In his own account of Tyndall's life, Huxley worked hard to rehabilitate his friend's reputation on this score. 'Modes of speech and action', he wrote, 'which some called mannerisms, or even affectations, were, in fact, entirely natural; and showed themselves, in full force, sometimes with a very droll effect, in the smallest gathering of intimate friends, or with one or two on a hillside.'[22]

In the 1870s and 1880s in particular, historians of the BAAS have identified an attitude of growing hostility towards the Association in the press. Roy McLeod and Peter Collins write of a 'general feeling of malaise'[23] and there was talk in periodicals and journals of the 'decay' of the BAAS and the British man of science, more broadly.[24] '[A]ll or nearly all of the intellectual giants in the world of science have already had their say', the new journal *Research* declared, reporting on the recent Association meeting at Newcastle.[25] Especially damaging were the attacks coming from the increasingly powerful anti-vivisection movement, in particular from its most vocal representative, Frances Power Cobbe. The physiologists were especially targeted, many of whom were prominent members of the BAAS, including Huxley himself and John Burdon-Sanderson.[26] According to the model of Carlylean heroism appropriated by the X-Club and the scientific naturalists more broadly, sincerity and self-discipline were the key attributes of the scientific gentleman. We remember that Francis Galton, a close associate of the X-Club, had pronounced men of science to be 'especially manly, honest, and truthful'.[27]

In her attacks, Cobbe argued that scientists' advocacy of vivisection involved a betrayal of these very principles. She described physiologists who practised vivisection as 'two-faced'.[28] In descriptions of their experiments written for the popular press, she claimed they conformed to contemporary moral standards of 'gentlemanly' behaviour which included compassion for the suffering of animals; in scientific descriptions circulated among themselves, however, they described carrying out cruel and sadistic acts upon innocent animals with 'joyful ardour'.[29] Similarly, Cobbe argued, the condemnation British physiologists expressed in their public accounts of 'foreign atrocities'[30] involving vivisection and the emphasis they placed on 'subordinating feeling to judgement'[31] (which implied their gentlemanly sensibilities *were* offended by animal suffering) was a lie. In reality, they not only enjoyed, but revelled in the suffering they caused, as a result of which they also lost their much-vaunted self-control. Their 'manliness',[32] she argued, was tantamount to cruelty and sadism. They were 'unnatural' men, who repudiated the wholesome and morally uplifting sympathy advocated by women—a secretive and deceptive scientific 'brethren'.[33] Connected with these claims was an accusation that British physiologists had deliberately abandoned their native ideal of the English gentleman for a cold, unfeeling 'foreign' model of scientific manhood. Specifically, Cobbe referred to the high proportion of English physiologists who had received training in German university laboratories, where

they had allegedly picked up their 'unnatural' attitudes towards the suffering of animals.[34] Their reading of Carlyle, heavily influenced, as he was, by German Romanticism and transcendental philosophy, would not have helped in this context.

Such was the impact of these attacks and the general perception that the BAAS was in decline in the early 1880s that its leading members took drastic steps to improve its public image. Perhaps the boldest of 'several bold strokes' made by the Association, was the decision to hold its 1884 annual meeting in Montreal, Canada, a move which began a tradition of gathering every few years in a British colony. This was a significant step and shows the BAAS actively drawing upon the masculinity of the new imperialism of the 1870s and 1880s. Roy McLeod has gone so far as to describe the BAAS, after 1884, as playing the role of 'Britain's scientific "Empire League"'.[35] In his account of the so-called 'overseas' meetings, Michael Warboys has argued that the 'decisive factor' in the move to hold the 1884 meeting in Canada was 'the perceived crisis in the Association's affairs in the early 1880s'. 'The leadership saw the Association as needing a new impetus', he wrote, 'and … the Montreal visit allowed [it] to ally itself with the new imperialism' and its language of active and forthright masculinity.[36] According to the report of its own council, presented to the general committee at Montreal, the BAAS hoped to gain renewed 'vigour and vitality' from the move.[37] It seems likely it was also designed to reaffirm the 'Britishness' of the Association and its members, given the recent accusations of Germanophilia by the anti-vivisectionists and a growing atmosphere of Anglo-German antagonism in society at large during these years.[38]

'Seven Devils Worse'

The 1870s and 1880s also witnessed the emergence of a new threat to the masculine reputation of the man of science: the commercially successful engineer. It is important to acknowledge that civil engineering had been a part of the British Association from its beginnings; mechanical science was one of the original sections (G). As we saw in Chapter 3, the climate in which the BAAS was founded in 1831 was receptive to the practical application of scientific research.[39] This was due, in part, to the influence of Humphry Davy, whose reputation for the successful application of his discoveries was at that time unparalleled; also at play was the general wish of the newly formed Association to distinguish itself (and science) from the

traditional figure of the reclusive scholar, leading a life of isolation away from the world.[40] The importance attached to the application of scientific discovery continued with the emergence of a new generation of scientific researchers, led by the members of the X-Club and strongly influenced by the ideas of Thomas Carlyle. As we saw in Chapter 5, Carlyle's notion of heroism stressed the need to unite speculation with action, to bring about real and beneficial change in the world.[41] Indeed, it was precisely this marriage of thought and action which inspired the reinvention of the 'gentleman-scientist' by Huxley, Tyndall and the other members of the X-Club in their attempts to stamp out aristocratic involvement in British science.

As the X-Club gained in influence, however, there was a gradual stepping away from this commitment to the practical application of science. Particularly visible in the work of Huxley, Tyndall and others on educational reform, it was increasingly science's role as part of a liberal education that was stressed, as a tool for the shaping of masculine character. Indeed, Huxley deliberately opposed this concept of education to a 'practical' (by which he meant a narrowly technical) training.[42] The drawing of this distinction naturally served to elevate the status of 'pure' research within the British Association as opposed to the application of science to practical problems. For some, applied science also carried the slur of 'prostituting' scientific talent for money. Through the work of Ruth Barton, in particular, we have seen that for Huxley and many others, the concept of the 'professional' scientist (in the modern sense of a salaried position), was viewed with a certain amount of discomfort and even distaste.[43] We recall the attacks on Davy following his commercial success which often made reference to his provincial and trade background ('He smells of the shop completely').[44] Even the influence of Carlyle, whose writings certainly called for the unity of thought and action, could have worked against the application of science. As we have seen, his emphasis on self-discipline and self-denial could help sustain ideals of ascetic manhood and a life withdrawn from the world.[45]

For all the BAAS's early commitment to civil engineering, W. H. Brock has shown that in the main 'academics predominated' in Section G. 'Between 1836 and 1881', he wrote, '76 per cent of the Section's Presidents were Fellows of the Royal Society, and an engineer, William Fairburn—an early member—was first elected to the Presidency of the Association only in 1861.' 'It is small wonder', he argued, 'that most writers have not seen the Association as playing any essential role in Victorian

engineering affairs.'[46] A sense of distance between the BAAS and the civil engineering profession became particularly acute in the late 1880s, when electrical engineering as a field came into its own, both in terms of commercial success and popular interest. As Brock has pointed out, although playing an important part in electrical research, the Association did not take the lead in developing practical applications of the research including some of the most famous and commercially successful inventions of the period, land and submarine telegraph cables and the telephone amongst them.[47] Indeed, the prominence achieved by electrical engineering with little direct input from the BAAS seemed to confirm what had been diagnosed a decade before—the decline or 'decay' of the Association. It no longer represented the arena where cutting-edge research and inventions were developed and discussed.

Somewhat ironically, this impression is conveyed most clearly in the presidential speech of Sir Frederick Bramwell, a prominent civil engineer, at the 1888 meeting. His speech was markedly defensive in tone, beginning with the admission: 'I am, as you know, a Civil Engineer, and I desire to laud my profession.'[48] Unusual among BAAS presidential addresses, it does not read like a speech given by the leader of a body talking confidently to his colleagues whose interests he shares; it rather gives the impression of an invited lecture, delivered by an outsider who is trying to explain the value of what he does to an audience implicitly hostile or doubtful of his importance. 'There are those, I know—hundreds, thousands', Bramwell declared,

> who say that … there is nothing ennobling in [the pursuits of the civil engineer]; that they are of the earth, earthy; are mechanical, and are unintellectual, and that even the mere bookworm, who content with storing his own mind, neither distributes those stores to others nor himself originates, is more worthily occupied than the civil engineer.[49]

It is a remarkable speech in that it reveals just how far the BAAS had moved away from esteeming the application of science as highly as 'pure' research. 'This Association', declared Bramwell, 'is for the "Advancement of Science"—the *Advancement* be it remembered; and I wish to point out to you, and trust I shall succeed in establishing, that for the *Advancement* of Science it is absolutely necessary that there should be the *Application* of Science.'[50] He condemned those in his audience and in general 'whose feelings, from a false notion of respect for Science, would probably find

vent in the "toast" … attributed to the Pure Scientist—'Here's to the latest scientific discovery: may it never do any good to anybody!'[51]

Bramwell's address, moreover, singled out the rapid advance of electrical engineering in recent years (which, as we have seen, took place largely outside the Association) to highlight the importance of applied science. Indeed, he claimed that in electrical science it had been commercial application which had driven 'pure' research.[52] There is 'no branch of physics', he declared, 'pursued with more zeal and with more happy results than that of electricity … and there is no branch of Science towards which the public looks with greater hope of practical benefits'.[53] This last sentence is significant, for it strongly implies that the most vibrant area of contemporary science and the area of greatest interest to the public lay predominantly outside the remit of the BAAS. In Bramwell's address, the Association appears to a large degree sidelined, reduced to the status of passive audience. Once again, the 'man of science' is cast in the role of reclusive scholar confined to his laboratory, consumed in the detail of pedantic research. This change is captured visibly in the associated decline of the phrase 'man of science' and the rise of the more technical term 'scientist', a development which also reflected the growing number of BAAS members who held academic posts in universities.[54]

The 1888 meeting marked a significant turning point in the public stature of the BAAS. It was in this year that the German physicist, Heinrich Hertz, conclusively demonstrated the existence of electromagnetic waves. It should have been a victory for the 'theorists'; many members of the BAAS, including prominent electrical researchers like Oliver Lodge, George FitzGerald and Silvanus Thompson, had anticipated the confirmation of electromagnetic waves since they had been predicted by the mathematician and BAAS member, James Clark Maxwell, in 1865. In the years before Hertz's discovery, Maxwell's theory had often been belittled by practical electrical engineers, including those involved in the BAAS. Foremost among these was the Post Office's Chief Engineer, William Henry Preece, who had been particularly dismissive, declaring 'stern experience' to be 'the best of all teachers—superior to all the theory in the universe'.[55] 'Practical men' like himself should not bow to those he termed 'slaves of mathematics'.[56] As Bramwell's address made clear, however, the engineers, or self-styled practical men, saw themselves as driving the research agenda in electrical science as well as applying its results in the development of new, commercially successful technologies. The division between 'pure' researcher and 'practical' engineer was growing, relegating the 'man of science' (increasingly 'scientist') to the isolation of his

laboratory.[57] In a report he compiled on the 1888 meeting at Bath, Oliver Lodge cited an editorial in *The Engineer* which argued that, in spite of Hertz's discovery, 'the world owes next to nothing to the man of pure science … [T]he engineer, and the engineer alone, is the great civilizer. The man of science follows in his train.'[58]

We can see this shift in attitude in the treatment of some of the period's leading men of science. T.H. Huxley himself, still actively involved in public debate in the late 1880s, was told repeatedly to 'return to the laboratory'.[59] In one of his last controversies, in December 1890, Huxley attacked the 'despotism' of the Salvation Army leader, William Booth. In reply, the socialist and trade union leader, Ben Tillet, wrote a letter to *The Times* denying Huxley's right as a mere 'theorist, scientist, and word juggler' to pass judgement on Booth, 'a practical man and a social expert'. 'Let Professor Huxley stick to the laboratory and protoplasm', he declared, 'and allow Booth to lead and fight in the rough battle of life, consummating a religion of humanity.'[60] Thus, for all Huxley's efforts to establish science as a key part of a liberal education designed to shape masculine character, by the late years of the century we see a return to the stereotype of the scientist as a reclusive and effeminate scholar.

In the very different political atmosphere of the 1890s, with a newly enfranchised working class and the growth of socialism, the public became the chief arbiter of scientific masculinity for the first time; and the public favoured the engineer, the practical man, the scientific equivalent of William Booth. Huxley saw this coming and he hated it. Writing to Hooker on 26 March 1889, just a few months after Bramwell's speech at the BAAS meeting at Bath, he condemned those he described as ignorant of any science except 'the science of self-advertisement'. 'When you and I were youngsters', he wrote to Hooker,

> we thought it the great thing to exorcise the aristocratic flunkeyism which reigned in the R.S. [Royal Society]—the danger now is that of the entry of seven devils worse than the first, in the shape of rich engineers, chemical traders, and 'experts' (who have sold their soul for a good price), and who find it helps them to appear to the public as if they were men of science.[61]

Back in the 1840s and 1850s, then, Huxley and his friends had sought to masculinize the image of science, to move away from the 'aristocratic flunkeyism' of the early BAAS and invest it with a new sense of moral earnestness and social purpose. Yet, now, they were at risk of being eclipsed

by a new 'devil'—the 'rich engineer'—who, like Bramwell in his 1888 presidential address, and Tillet in his letter to *The Times*, once again identified the man of science firmly with the effete scholar, living in retreat from the world.

Marconi, Wireless Telegraphy and the 1899 Dover Meeting

We can see these divisions clearly on display at the Dover meeting of the BAAS in September 1899. It was at this meeting that Guglielmo Marconi's wireless telegraphy was demonstrated publicly for the first time across a national border. As we shall see, Marconi, perhaps more than any other figure, came to embody the spectre of the rich engineer, dreaded by Huxley as seven devils worse than the aristocrats who had dominated British science in the early part of the century.[62] Marconi had set up his equipment in the town hall at Dover and transmitted messages of welcome and greeting to a receiving station at Wimereux, near Boulogne, where the *Association Française pour l'Avancement des Sciences* was to meet at precisely the same time. Many newspapers positively raved about the achievement.[63] Professor J. Ambrose Fleming, whose evening lecture on 'A Centenary of Electricity' provided the backdrop for Marconi's wireless technology, wrote ecstatically to *The Times* shortly after the successful demonstrations, declaring that the young Italian inventor had bridged 'a vast gulf [that] separates laboratory experiments, however ingenious, from practical large scale demonstrations'. He had, he wrote, translated 'one method of space telegraphy out of the region of uncertain delicate laboratory experiments, and plac[ed] it on the same footing as regards certainty of action and ease of manipulation … as any of the other methods of electric communication employing a continuous wire between the two places'.[64]

As we have seen in earlier chapters, the BAAS was no stranger to public demonstrations of new inventions. Many of the scientific sensations of the nineteenth century had been introduced to the public at Association meetings. To provide such a forum had indeed been a major part of the BAAS's remit since its earliest days. This demonstration of Marconi's wireless telegraphy was different, however. The man appeared almost bigger than his invention; almost all the credit for the development of the technology in newspaper articles covering the event went to Marconi. This was despite, as Sungook Hook, Graeme Gooday and others have

shown, Marconi built upon and refined the work of a number of other scientists including prominent BAAS members, Oliver Lodge and George FitzGerald.[65] Moreover, the demonstrations themselves were not given as part of a traditional scientific paper read before one of the sections. Instead they took place during the evening lecture of Professor Fleming, by this time a scientific consultant to the Marconi company and, indeed, at regular intervals throughout the week-long meeting. As such, they are better understood as forming part of the entertainment programme, their primary aim being to impress the crowds of assembled British, French and foreign scientists.

Nor was Marconi himself actually present. After ensuring his equipment had been set up and tested, he left the day before the meeting started on a ship bound for America. Newspapers speculated as to whether his departure on the eve of the meeting was intended as a deliberate snub to the BAAS who had, by no means, always welcomed Marconi into their midst;[66] as it turned out, his primary concern when he reached New York was to set up a wireless telegraphy link between the office of the *New York Herald* and the America's Cup yacht race so that the latest developments could be communicated to the paper as quickly as possible. At the same time, he began serious preparations for establishing transatlantic wireless telegraphy.[67] For Marconi, the BAAS meeting at Dover was, in the true sense of the phrase, a publicity stunt; he had little interest in becoming involved with the British Association or taking part in its social activities.

His position just one year earlier had been rather different. His wireless telegraphy had been far less advanced and he had personally attended the Bristol meeting of the BAAS in 1898 with Preece, hoping merely for an opportunity to explain his invention and its possibilities. In the intervening twelve months, however, he had successfully transmitted messages between Queen Victoria's residence at Osborne House on the Isle of Wight and the royal yacht, *Osborne*, using long waves and very high antennas; he had transmitted from the Needles on the Isle of Wight to the East Goodwin lightship thirty kilometres out at sea and then over fifty kilometres between Salisbury and Bath; and in the spring of 1899 he successfully transmitted signals across the English channel.[68] All this was achieved with little help from the BAAS; instead, it was the sponsorship of the British Post Office and Preece, their chief engineer, as well as the growth of Marconi's own company, established in 1897, which provided the necessary financial and technical support.

As such, Marconi represented a very different model of scientific masculinity from that which had predominated in the BAAS under the influence of the X-Club in the 1860s and 1870s and continued to set the tone within the Association at the end of the century. The image of the ideal man of science, set out by Huxley, Tyndall and the other educational reformers of the 1870s, as a morally earnest, hard-working and self-denying figure, working, not for private gain, but for public benefit, had not altered substantially within the BAAS as a whole.[69] Professionalization of science, often identified as a key goal of the Association, certainly made headway in the country at this time, but largely without the assistance of the BAAS. As a body, indeed, it retained, as we will see in Chapter 7, a deeply ambivalent attitude towards the concept of professional scientists (especially those working for private profit) until at least the outbreak of the First World War.[70]

Here, it is worth focusing briefly on the figure of Oliver Lodge, whose attitudes may, to some extent, be taken as typical of other electrical researchers of his generation prominent within the BAAS. Inspired to take up a career in scientific research by attending Tyndall's Royal Institution lectures in 1866–7, he was taught by Huxley and Frankland at the Royal College of Science in 1873.[71] Having heard Clark Maxwell speak at the BAAS meeting in Bradford the same year, he became a devoted member of the Association, attending every year, including regular Red Lions dinners together with Huxley.[72] Lodge's attitudes towards science and his ideal man of science were thus closely bound up with his X-Club mentors. In the early 1900s, Lodge would become a rival and critic of Marconi, complaining bitterly for many years (before eventually selling his patents to the Marconi company) that Marconi had unfairly stolen and developed his ideas. Despite having demonstrated his own version of wireless telegraphy at not one but three successive British Association meetings in the early 1890s, Lodge had failed to apply for patents for the technology and to exploit his ideas commercially.[73]

For many prominent BAAS members in the 1890s, the Baconian vision of science as a collective effort, which had animated the Association's founders in 1831, retained a powerful attraction. Likewise, scientific masculinity, understood in terms of the exploration, control and subordination of nature, remained a collective rather than an individual act. Not only did Marconi appear to pursue science primarily for personal fame and fortune; at Dover in 1899 he seemed to go further than this, asserting ownership over the very internationalism of science. From its inception, the BAAS

had positioned itself as a body uniquely capable of representing the international spirit of science within Britain and its empire. As stated in its original objectives proclaimed at York in 1831, it sought 'to promote the intercourse of those who cultivate Science in different parts of the British Empire, with one another, and with foreign philosophers'.[74]

Indeed, it was to celebrate and promote these links with continental science that the decision was taken to hold the 1899 meeting at Dover in the first place. It had nothing to do with Marconi's desire to carry out cross-channel wireless telegraphy but, rather, to promote reciprocal and friendly relations with the French Association for the Advancement of Science which was holding its own meeting in Boulogne on the other side of the channel. This is clearly seen in an article covering the 1899 meeting in *The Freeman's Journal and Daily Commercial Advertiser*. The seemingly unstoppable progress in science throughout the nineteenth century had been due, it argued, to the fact that 'each man of science was not his own master, but one of many obedient servants of an impulse which was at work long before him, and would work long after him'. Paraphrasing the presidential speech of Sir Michael Foster, the article dismissed the 'popular' idea that science should be pursued chiefly for material and commercial success. Recalling the ideal of the man of science as Carlylean hero, promoted by the X-Club and largely taken up within the BAAS, it argued that '[t]he features of the scientific mind were in the main three, viz, strict truthfulness, courage, and alertness of mind'. Nature was the mistress of the obedient scientist, 'and step by step she led him on towards the perfect obedience which was complete mastery'. This was a noble quest, raising men above the petty concerns of nation and empire, calling all to abandon such narrow loyalties in the search after higher truth. 'To the man of science', the article concluded, 'the barriers of manners and speech which pen men into nations become more and more unreal and indistinct. The touch of science made the whole world kin.'[75]

The whole meeting at Dover appears to have been suffused with this attitude. There were hearty greetings exchanged with the French Association via wireless telegraphy and large parties of up to three hundred guests travelled both ways across the Channel over the course of the week. Describing the meeting soon afterwards, Norman Lockyer recalled that 'when he saw the two presidents—Sir Michael Foster and M. Brouardel—walking arm in arm on the promenade it seemed to him that henceforth patriotism, as opposed to the best interests of humanity, had ceased to exist'.[76] The official welcoming speech given to the French

visitors by the BAAS president, Sir Michael Foster, struck a very similar note: 'The sea which you have just crossed', he declared, 'separates our countries, but science, the pursuit of the absolute truth, unites our hearts by a brotherly bond.'[77]

Professor Fleming even tried, through his lecture, to insert Marconi into this communal story of scientific struggle and endeavour. His theme was the centenary of the electric current, the lecture beginning with the Italian Alessandro Volta's discovery of the electric current in 1799, and ending with Marconi's invention and development of wireless telegraphy, displayed with great success at the Dover meeting. In this narrative, Marconi, another Italian inventor and scientific genius, completed the circuit begun with Volta. Indeed, he stated that the principles of the electric current, developed by Volta, 'had received their most logical extension and completion in the evolution of the electro-magnetic wave telegraphy, developed by Signor Marconi on such a grand scale within the last few years'. The terms in which he described Volta's discoveries—'an invention epoch-making in the history of the world'—were doubtless meant to be applied by the listening audience to Marconi's wireless telegraphy which they saw demonstrated several times during the lecture itself.[78] While Marconi was singled out in Fleming's speech, he was not, however, presented as unique, but one of a number of great figures in a remarkable collective effort to advance science which had spanned the nineteenth century.

'The Rich Engineer'

To this ideal of scientific masculinity, which stressed the subordination of private interests to the collective effort of science, Marconi with his private company and closely guarded patents offered a considerable contrast. He had never been an insider at the BAAS even though his contact with the Association had begun some three years earlier in 1896. He had always required an introducer—in 1896, it had been Preece. Although Marconi was himself present at the Bristol meeting in 1898, *The Bristol Mercury* reported that 'Mr. W. H. Preece … has arranged to have an exhibition of wireless telegraphy at the Conversazione at Clifton College.'[79] Just twelve months later, when his star had risen, Marconi felt no need to remain at the Dover meeting to carry out his demonstrations in person. While doing as much as possible in the run-up to the meeting to publicize his technology, releasing statements to the press and giving interviews to a wide range

of newspapers, he nonetheless departed for America the day before the meeting started.

In the vast majority of these articles, emphasis was placed firmly on the personal greatness of Marconi; little mention was made of the British Association; it seemed to function merely as a location, a background setting against which to display Marconi's talent and to advertise his invention. As an article in the *Pall Mall Gazette* put it, 'Signor Marconi is preparing a little eye-opener for the British Association.' In this formulation, Marconi was the instructor and the members of the BAAS his willing pupils. Reporting on the success of preparatory experiments already carried out at Dover, the article portrayed Marconi as a lone figure of genius, a paragon of scientific masculinity, working without partners. 'Mr. Marconi has fairly caught and tamed the lines of electric force,' it declared.[80] In a similar piece in *The Sheffield and Rotherham Independent*, most likely derived from a statement to the press released by Marconi himself, the BAAS meeting appears merely as another location in a much longer grand narrative of the development of wireless telegraphy over recent months. The title of the article reads: 'Wireless Telegraphy: The Latest Wonder'.[81]

An article published in *The North-Eastern Daily Gazette* a couple of weeks before the start of the meeting, referred to the exhibition of Marconi's wireless telegraphy as the thing which would make the BAAS meeting worth attending. Hailing it as 'the most sensational event' on offer, the piece criticized Association members for previously excluding Marconi from their midst. 'Signor Marconi', its writer declared, 'attended the British Association meeting at Bristol last year, but it was not his fortune to get the opportunity he no doubt wished to exhibit and explain his invention.' 'There will be no lack of opportunity at the Dover meeting', he continued, maintaining that the 'greatest sensation of the century' and Marconi's 'astounding success' had forced the Association's hand. Indeed, he concluded, the BAAS should be grateful to Marconi for 'these exhibitions will contribute in no small degree to the popularity of the … forthcoming meeting'.[82] In its coverage of the Dover meeting, *The British Architect* went even further, declaring that Marconi's wireless telegraphy 'will be the most interesting scientific accomplishment' on display. It spent the rest of the article discussing the likelihood of Marconi successfully establishing wireless telegraphy between Britain and the America, praising his 'absolutely perfect … specimens of telegraphic work' and crediting him with yet 'another triumph for the new telegraphy'.[83]

A similar impression of the changed relationship between Marconi and the British Association was given in interviews with Marconi himself at Dover shortly before his departure for America. Using this platform to promote himself and his latest ambitions for transatlantic wireless telegraphy, Marconi placed the BAAS, and the scientific world in general, in the role of passive audience, reacting to the latest product of his own genius. Referring to the cross-channel experiments to be demonstrated at Dover, one reporter wrote,

> Signor Marconi had been speaking about the effect produced in the scientific world when he succeeded in transmitting messages across the English Channel … and wondered if it would create much surprise if he succeeded in sending a message from England to America. 'It is a very long distance', he remarked. 'I do not say it will be done yet, but many things which seemed impossible have been accomplished.'[84]

Here, Marconi cast himself as the brave and talented 'young hero' (to use the words of Sungook Hong),[85] and the BAAS as a group of conservative, over-cautious old men.

Another version of the same interview printed in *The Standard* on 21 August 1899 described the Association meeting as nothing more than the place where 'the French and English scientific visitors are to have the opportunity of witnessing the success which this new telegraphy is capable of achieving'.[86] In *The Penny Illustrated Paper* on Saturday 26 August, a notice of the forthcoming meeting was illustrated solely with a portrait of Marconi and his wireless coherer.[87] Referring to the growing rhetorical divide between 'theorists' and 'practical men', an article in *The Outlook*, published on 16 September 1899, credited Marconi with transforming 'wireless telegraphy from a mere laboratory experiment' into a 'work-a-day fact'. 'The demonstrations of its [Marconi's system] working and discussion of methods are looked on as the chief event of the meeting', which was, however, to be 'shorn … of half its lustre by the unavoidable absence of Signor Marconi in America'.[88]

Marconi's own attitude towards the BAAS and the British scientific establishment more broadly, is apparent from an article he wrote under his own name for *The Fortnightly Review* nearly three years after the Dover meeting in June 1902.[89] His prime concern in the article is clear from its title: 'The Practicability of Wireless Telegraphy'. His purpose in the lengthy piece was to tell his own narrative of the history of wireless

telegraphy, placing himself in the leading role and his own system as the pinnacle of the story. Before a carefully chosen series of audiences, including leading men of science, British royalty and the American public, he portrayed himself as the practical man *par excellence*, seeking to apply his invention for the good of all.

He began by describing how he invited the famous physicist, Lord Kelvin, then Professor at Glasgow University, to view his equipment at 'my Alum Bay station'.[90] His frequent repetition of 'my' is striking and provides an insight into his use of language to assert ownership over the technology.[91] In Marconi's construction, Lord Kelvin merely served as an illustrious bystander, designed to boost his own reputation. 'Lord Kelvin', we are told, 'was so much pleased with what he saw.' In a carefully stage-managed format, Kelvin was able to send the 'first paid message by etheric wave telegraphy' to Magnus Maclean, Lecturer in Electricity at Glasgow, and then to leading university physicists and prominent members of the BAAS, Sir George Stokes in Cambridge and Lord Rayleigh in London.[92] To illustrate the position he claimed for himself as the sole inventor of wireless telegraphy, Marconi chose a strikingly masculine image. He described himself as 'in command of a great force, by means of which stupendous results can be produced for the benefit of mankind'. Throughout the article, Marconi frequently refers to his 'assistants', and arguably the great men of British science, Lord Kelvin and Lord Rayleigh, are also cast in this role.[93]

Having placed the scientific world in the position of audience, Marconi next moved on to British royalty. The second 'chapter' in the story, entitled 'On the Royal Yacht', recounted how the Prince of Wales had badly injured his knee at sea and how Marconi was 'asked' to use his invention to allow Queen Victoria, who was staying on the Isle of Wight, to have regular updates on his progress. Once again, as with Lord Kelvin and Lord Rayleigh, the royal family were placed firmly in the position of audience: 'The instruments on the yacht were operated and observed with great interest by the various distinguished persons aboard, notably the Duke of York, the Princess Louise, and the Prince of Wales himself.'[94] In case his own testimony proved insufficient, Marconi cited the *Electrical Review* to the same effect: 'The Prince of Wales and other Royalties gave expression to Mr. Marconi of their high appreciation of his system, and their astonishment at the perfection to which it had been brought.' Next, we see Marconi, once again in the active role, lecturing before the Institute of Electrical Engineers, instructing them about the superiority of his system.

His lecture there, he wrote, 'awakened great interest', not just among the engineers but among 'the public' at large, who 'began to see the practical uses to which the system might be put'.[95]

In this broadly chronological narrative, Marconi proceeded to leap over the BAAS meeting at Dover in 1899 to move on to still greater audiences. Instead, he recounted how he was invited by the *New York Herald* to use his wireless system to narrate the progress of the America's Cup yacht race and of 'the interest manifested in the trials by the American people'.[96] The crescendo of the story, however, was greater still, as Marconi moved from a national to an imperial stage. He recorded how he had to cut short his trials with the United States navy as he had been urgently summoned by the British government to bring his wireless telegraphy to their aid in the South African War. 'The call from England', he declared, 'was now imperative.'[97] Only at the very end of the piece, almost as an afterthought, listed under the far less glamorous subtitle, 'Further Proofs of Practicability', do we find a mention of the BAAS meeting at Dover. As might be expected, the focus was on Marconi and the demonstration of 'my system … before the English and French bodies'. Moreover, he linked himself clearly with the great Volta, the discoverer of the electric current, as Fleming had attempted to do in his lecture at Dover: 'On the centenary of the day when Volta's great discovery of the electric current became known to the world', declared Marconi, 'messages of congratulation were sent by the English Association through the ether to the French scientists, thence on to the Italian body by land wires.'[98]

Challenging Marconi

To many in the BAAS, Marconi seemed motivated purely by a desire for personal aggrandizement with little concern for science as a great, collective effort. In the years immediately following the Dover meeting, Marconi and his company publicly rejected the internationalism of science by enforcing the doctrine of non-intercommunication which meant that Marconi receiving stations were forbidden from communicating with wireless telegraph systems employing non-Marconi wireless equipment.[99] Such a policy seemed to ride roughshod over the internationalism upon which the British and French Associations had placed such weight at Dover. Likewise, Marconi insisted on taking all of the credit for his inventions.[100] Lodge, in particular, who harboured considerable personal resentment towards Marconi, criticized him for exploiting his invention

so ruthlessly when it should be a gift to the world. Writing to *The Times* in 1906, following an international congress on wireless telegraphy organized by the German Kaiser in Berlin, Lodge identified Marconi clearly with the bankers and industrialists rather than the men of science. 'The financiers … who constitute the directorate of the Marconi Company are doubtless entitled to a share of credit and profit for their energy and enterprise', he declared, 'but they are not entitled to a monopoly. It would not only be unjust, it would be in high degree foolish to allow a monopoly … to arise in connexion with this application of world-wide science.'[101] Moreover, in a private letter to Fleming, Lodge declared his friend's public support for Marconi in *The Times* tantamount to publishing an 'indictment against men of science';[102] in other words, he considered showing public support for Marconi to be akin to attacking the collective honour and masculinity of British science.

Many within the British scientific world questioned the extent to which Marconi's invention really was new. Even *The Outlook*, which in the immediate aftermath of the Dover meeting had been caught up in the rush of excitement surrounding Marconi's demonstrations, reflected more cautiously a little later, that 'The Dover Meeting has been of … interest and value, not in the way of new discoveries so much as in that of explanation and getting the perspective of laws and properties already known.' Fleming's lecture, moreover, which had sought to link Marconi with Volta in the minds of the audience, was 'chiefly valuable as an authoritative statement of certain scientific principles involved in wireless telegraphy', and as such was clearly bigger than Marconi alone. Indeed, the writer concluded, the basic principles of Marconi's invention, in particular 'that certain gases, and even tubes filled with finely-powdered metals [such as constituted Marconi's receiving instrument], would act as conductors … had long been known'.[103]

An article in *Chambers's Journal* from 25 November 1899 reported almost sarcastically upon the supposed novelty of Marconi's demonstrations at Dover. Under the heading 'Wireless Wonders', ironically set in inverted commas, the article commented that the collected press 'described … under this somewhat sensational heading some of the experiments with wireless telegraphy in connection with the British Association meeting at Dover'. 'But', it continued, 'there was absolutely nothing new introduced, and the experiments were, as usual, confined to the Channel.' Sceptical of Marconi's claim that his wireless system would put cable telegraphy

out of business, the article declared: 'it is difficult to get the newspaper-reading public to understand that there is all the difference in the world between pre-arranged experiments, specially laid out for success, and ordinary everyday practical working.' Whereas 'people [in Britain] … have gone wild over wireless telegraphy', 'the Americans have taken the matter more philosophically', we are told. While the *New York Herald* admitted that Marconi's system worked perfectly when transmitting updates on the yacht race, the writer for *Chambers's Journal* quoted the newspaper's conclusion that 'No practical advantage is apparent, the accustomed methods being quite as good.'[104]

A week later, an article in the same journal went further, endorsing the view of Silvanus Thompson, Professor of Physics at Bristol, that little about Marconi's system was truly innovative. Indeed, it presented its own chronology of the development of wireless telegraphy and the contrast with Marconi's version, discussed above, is stark. Marconi himself only appears in a minor role after a long list of other, greater, figures with an established scientific and academic reputation. 'Experiments have been made in various directions', the article began, 'under more or less responsible auspices', suggesting right from the start a divide between experiments carried out by reputable men of science and demonstrations by commercially minded entrepreneurs like Marconi.[105] This article, moreover, took the story of wireless telegraphy much further back in time. 'Oddly enough', it declared, 'the idea of this so-called "new" telegraphy is a very old one. So long ago as 1842 Morse, the great American telegraph inventor, worked at the subject, and made experiments on the Susquehanna River, about a mile wide.' 'But perhaps the most definite results', we are told,

> were achieved by James Bowman Lindsay, of Dundee, who so long ago as 1831, conceived the idea of using water instead of wires to convey electric signals, and actually did convey them across the Tay more than 40 years ago. He even went so far as to express the opinion that signals might be so conveyed across the Atlantic; and in the printed proceedings of the B.A. for 1859 his method of doing so is briefly described.[106]

It also discussed the contribution of Preece, who, 'so long ago as 1882 … conducted a series of researches upon the establishment of telegraphic communication between the Isle of Wight and the Hampshire coast without any connecting cable across the Solent'. In 1893–4, the article

continued, 'Mr. Preece established communication across the Kilbrannan Sound, between the Isle of Arran and Kintyre, a distance of over 4 miles; and he also maintained telephonic speech across Loch Ness, a distance of a mile and a quarter.'[107]

From Preece, the article moved on to 'yet another method of telegraphing across space … called the "electric-wave method"' and to 'Professor Oliver Lodge [who] has done much in this direction'. Lodge's experiments at Oxford in 1894 were praised for successfully establishing 'communication … between the university museum and the adjacent building of the Clarendon Laboratory'. Only after Preece's and Lodge's work had been discussed at length was Marconi mentioned and not in especially flattering terms. First, he was portrayed as dependent upon the good favour of British science and the British state; then a relatively long description of his background was offered, giving the impression that he was not an established member of the scientific community. To similar effect, his youth was also stressed: 'The British Telegraph Department afforded facilities to Mr. Marconi, a young Italian, who about 2 years ago brought to this country an invention of his in the form of a "receiver".'

Not only did the article reassert the collective nature of the scientific endeavour that produced wireless telegraphy and position Marconi as a relatively minor figure within that narrative; it went on to vastly undermine the claims which Marconi made for his invention. Indeed, the author quoted Silvanus Thompson to the effect that truly wireless telegraphy, which is what Marconi claimed to have invented, was actually not even possible: 'One thing is certain, however—there is no such thing as "telegraphing without wires"; and it is equally certain that the base-line, or base-area, surrounded by wires, is a fundamental necessity.' Significantly, it set up Silvanus Thompson (and the scientific establishment he represented) as a rival to Marconi, employing visionary language similar to that used by Marconi himself in his press releases and interviews shortly before the Dover meeting. 'Professor Thompson is of opinion', we are told,

> that it is possible to establish electric communication between England and America, and even with the Cape, India, or Australia, without the intervention of a submarine cable. So sanguine is he, indeed, that some 8 years ago he offered to one of his financial friends in the City to undertake seriously to establish telegraphic communication with the Cape, provided £10,000 were forthcoming to establish the necessary 'basal' circuits in the two countries and the instrument for creating the currents. His offer was deemed 'too visionary' for acceptance; but he still holds that the thing is quite feasible.[108]

The attitude displayed in these articles is broadly representative of the views of the British scientific establishment towards Marconi and his strategy of self-promotion. The BAAS collectively did not warm to Marconi's style of doing things. Despite the centrality of his demonstrations at the Dover meeting, the official report of proceedings did not mention Marconi by name. The report of the following year's meeting in Bradford, moreover, criticized him for having merely created a 'sensation' at Dover which unfairly 'distracted attention from the more practical and older method' of wireless telegraphy developed by Lodge and which had 'in the meantime' been 'much advanced … by introducing admirable call systems'.[109] In his personal reminiscences of the BAAS, published in 1931 under the title, *Advancing Science*, Oliver Lodge confirmed this rewriting of the narrative of the 1899 meeting with the omission of Marconi and his wireless telegraphy. Although declaring that the meeting remained indelibly etched on his memory, it was not because of Marconi but rather the discovery of the electron by Sir J. J. Thomson. This, Lodge claimed, constituted the 'feature of the meeting', and was the discovery which dominated all subsequent discussion at Dover, so much so that Lodge could not concentrate on his own paper when it was his turn to speak.[110]

Marconi's response to these rival narratives of the development of wireless telegraphy was brief and cutting. He denounced them as the petty jealousies of 'theoretical men'. When asked about the accusations of Lodge and others that he had unfairly used their ideas and claimed them as his own, he dismissed them as a mere 'diversion', caused by what he termed 'rival claimants for wireless telegraphy honours'. Presenting them, like himself, as lone individuals, rather than as representatives of the scientific community more broadly, as they positioned themselves, he declared: 'They believed, and wanted others to believe, that I was receiving credit that belonged to them, which is a not unusual claim in connection with any successful invention.' Citing the *Scientific American*, he stressed that while there might have been some 'mere theoretical discoveries' before his own work, he was, and always would be remembered as, the 'practical' man who transformed these insights into reality. 'Whatever may be the merits of this controversy', the journal stated,

> we are satisfied that it would be as easy to sweep back the tide with a broom as to prevent the system of telegraphy which has just done such good work off New York Harbour and with the English Fleet from becoming forever identified with the name of the man who first brought wireless telegraphy to a practical and useful consummation.[111]

The 1899 Dover meeting occupies a relatively unimportant place in the history of both the British Association and Marconi's own career. It does, however, make clear the extent to which the ideal of the man of science as a humble, morally earnest seeker after truth, which had dominated the BAAS since the heyday of the X-Club, was facing increasing pressure from new models of scientific masculinity developed by individuals outside the Association. The late 1870s and early 1880s represented a particularly difficult time for the BAAS, with increasingly virulent attacks from anti-vivisectionists and a growing divide between so-called 'theoretical men', prosecuting 'pure' research and those applying the results of research to practical problems. In the late 1880s, Huxley foretold the arrival of the figure he denounced as 'the rich engineer' who would come to pose an existential threat to his cherished vision of the man of science as moral hero. Marconi's appearance on the scene in the late 1890s with his conception of science as a financial and commercial enterprise, made real this threat. Through the emphasis he placed upon his own role and achievements, and his ruthless and effective promotion of his wireless system, BAAS members at Dover were reduced to the status of audience and their annual meeting became a stage on which Marconi performed.

Notes

1. Roy McLeod, 'Retrospect: The British Association and its Historians' in R. McLeod and P.D.B. Collins, *Parliament of Science* (1981), p. 1.
2. Kingsley, *Glaucus*, p. 7.
3. Ibid., p. 11.
4. [Brewster], 'The British Association for the Advancement of Science', *North British Review* 14:27 (November 1850), pp. 235–287. Here the comparison with Brewster's *Edinburgh Review* article from October 1830 is instructive, in which he called for the establishment of something similar to the BAAS. This article from twenty years earlier reveals clearly the difficulties faced by those seeking to rebut gendered criticisms directed against men of science before the foundation of the British Association in 1831. Brewster argued that the achievements of male scientists were of equal value, though qualitatively different, from the martial valour of Britain's military heroes and should be recognized as such by the government and society more broadly.

5. [Brewster], 'The British Association for the Advancement of Science', p. 235.
6. Ibid., p. 285.
7. Ibid., p. 287.
8. Ibid., p. 261.
9. This was particularly the case with the figure of the scholar and scientist. Carlyle stressed, like his friend Ralph Waldo Emerson, that speculation could only be manly if it led to purposeful action.
10. Adams, *Dandies and Desert Saints*, p. 8.
11. White, *Thomas Huxley*, p. 20.
12. Ibid. p. 61.
13. Thomas Huxley to his sister, Elizabeth (21 November 1850), cited in ibid., p. 20.
14. Thomas Huxley to Henrietta Heathorn (9 July 1851), cited in ibid., p. 25.
15. Howard, 'Physics and Fashion', p. 747.
16. Ibid., p. 747.
17. Ibid., p. 736.
18. Ibid., p. 753.
19. See p. 87.
20. Howard, 'Physics and Fashion', p. 753.
21. Ibid., p. 752.
22. Huxley, 'Professor Tyndall', p. 4.
23. Roy McLeod, 'Introduction: On the Advancement of Science' in McLeod and Collins, *Parliament of Science*, p. 31.
24. Ibid., p. 32.
25. 'On the B.A.A.S. at Newcastle', *Research* I (1889), p. 74, cited in McLeod and Collins, *Parliament of Science*, p. 41.
26. Huxley had been BAAS president in 1870 and John Burdon-Sanderson was to be president in 1893.
27. See p. 133.
28. See Frances Power Cobbe, *Vivisection and its Two-Faced Advocates* (1882), in Laura Otis ed., *Literature and Science in the Nineteenth Century: An Anthology* (Oxford: Oxford University Press, 2002), pp. 215–219.
29. Cited in Anne DeWitt, *Moral Authority, Men of Science and the Victorian Novel* (Cambridge: Cambridge University Press, 2013), p. 136.
30. Cobbe, *Vivisection and its Two-Faced Advocates*, p. 219.

31. Ibid., p. 217.
32. DeWitt, Moral Authority, *Men of Science and the Victorian Novel*, p. 136.
33. Cobbe, *Vivisection and its Two-Faced Advocates*, p. 220.
34. For more on the accusation that British physiologists had imbibed foreign, specifically German, attitudes, see Rob Boddice, 'German Methods, English Morals: Physiological Networks and the Question of Callousness, c. 1870–81' in Heather Ellis and Ulrike Kirchberger eds., *Anglo-German Scholarly Networks in the Long Nineteenth Century* (Leiden: Brill, 2014), pp. 84–102.
35. McLeod, 'Introduction' in McLeod and Collins eds., *Parliament of Science*, p. 32.
36. Michael Warboys, 'The British Association and Empire: Science and Social Imperialism, 1880–1940' in McLeod and Collins eds., *Parliament of Science*, p, 174.
37. *Report of the Council for the year 1883–84, presented to the General Committee at Montreal, on Wednesday August 27, 1884*, p. i (BL Dep. BAAS 166).
38. See, for example, Paul Kennedy, *The Rise of the Anglo-German Antagonism, 1860–1914* (London: Ashfield Press, 1980).
39. See p. 55.
40. See, for example, William Vernon Harcourt's speech as BAAS president at the 1839 meeting at Birmingham: 'The system of your meetings, Gentlemen, has brought together things which ought never to be disjoined – the principles of science with their application to human use…The theorist and the mechanician here meet to the mutual advantage of both.' 'Ninth Meeting of the British Association for the Advancement of Science', *Athenaeum* 618 (31 August 1839), p. 651.
41. See p. 122.
42. See White, *Thomas Huxley*, pp. 67–99.
43. See, in particular, Barton, 'Men of Science'.
44. See p. 87.
45. See p. 150.
46. Brock, 'Advancing Science', p. 94.
47. See the presidential address of 1888 by Sir Frederick Bramwell. *Report of the Fifty-Eighth Meeting of the British Association for the Advancement of Science* (London: John Murray, 1889), p. 6.
48. Ibid., p. 8.

49. Ibid., p. 9.
50. Ibid., p. 4.
51. Ibid., p. 5.
52. Ibid., p. 6.
53. Ibid., p. 7.
54. White, *Thomas Huxley*, p. 173.
55. Cited in E.C. Baker, *Sir William Preece, F.R.S., Victorian Engineer Extraordinary* (London: Hutchison, 1976), p. 107.
56. 'Discussion,' *Electrician* 21 (1888), 644–645.
57. See Bruce J. Hunt, '"Practice vs. Theory": The British Electrical Debate, 1888–1891', *Isis* 74 (1983), 341–355. See also Bruce J. Hunt, *The Maxwellians* (London: Cornell University Press, 1991).
58. '"Next to Nothing"' (editorial), *The Engineer* 66 (1888), 203, cited in Oliver Lodge, 'Sketch of the *Electrical* Papers in Section A at the recent Bath Meeting of the British Association' *Electrician* 21 (1888), 622–625.
59. Ibid., p. 173.
60. *The Times* (23 December 1890), cited in White, *Thomas Huxley*, p. 165.
61. T.H. Huxley to J.D. Hooker (26 March 1889) in Leonard Huxley ed., *Life and Letters of Thomas Henry Huxley* Vol. 2, p. 246.
62. Hugh G. J. Aitken has stressed Marconi's importance in heralding a new age in science and technology. 'For this historian', he writes, 'there is, with Marconi's arrival, the feeling of entering into a different world—the world, not of the scientist but of the engineer, and the entrepreneur.' See Hugh G. J. Aitken, *Syntony and Spark: The Origins of Radio* (New York: Wiley, 1976), p. 26.
63. See, for example, *Aberdeen Weekly Journal* (17 August 1899); *Pall Mall Gazette* (17 August 1899); *The Standard* (17 August 1899); *Yorkshire Herald* (17 August 1899); *Aberdeen Weekly Journal* (18 August 1899); *The Sheffield and Rotherham Independent* (18 August 1899); *The North-Eastern Daily Gazette* (19 August 1899); *Nottinghamshire Guardian* (19 August 1899); *The Morning Post* (21 August 1899); *The Standard* (21 August 1899); *Huddersfield Daily Chronicle* (22 August 1899); *The Yorkshire Herald* (22 August 1899); *The Penny Illustrated Paper* (26 August 1899); *The Morning Post* (12 September 1899); *The Sheffield and Rotherham Independent* (13 September 1899); *The Morning Post* (13 September 1899); *The Liverpool Mercury*

(22 August 1899); *The Belfast News-Letter* (14 September 1899); *Glasgow Herald* (14 September 1899); *Freeman's Journal and Daily Commercial Advertiser* (14 September 1899); *The Sheffield and Rotherham Independent* (14 September 1899); *Nottinghamshire Guardian* (16 September 1899); *Aberdeen Weekly Journal* (21 September 1899); *The Times* (18 September 1899), p. 8; *The Times* (19 September 1899).

64. *The Times* (3 April 1899); p. 6; Issue 35793; col B. 'Wireless Telegraphy', Letters to the Editor, cited by Sungook Hong, *Wireless: From Marconi's Black Box to the Audion* (MIT Press, 2001), pp. 56–7.
65. See Hong, *Wireless*; Graeme Gooday and Elizabeth Bruton, 'Marconi the Monopolist? Patents, Imperialism and Inter-Communication at the Berlin 1906 Radiotelegraphic Congress'.
66. One article discussed whether Marconi had an 'ulterior object … in his visit to America'. See *The Morning Post* (13 September 1899).
67. See, for example, 'Wireless Telegraphy', An Interview with Signor Marconi, *The Morning Post* (21 August 1899); 'Wireless Telegraphy', *The Sheffield and Rotheram Independent* (13 September, 1899).
68. Hong, *Wireless*, p. 56.
69. See, for example, Barton, 'Men of Science', pp. 73–119.
70. See Chapter 7.
71. Peter Rowlands, 'Lodge, Sir Oliver Joseph (1851–1940)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edn, Jan 2011 [http://www.oxforddnb.com/view/article/34583, accessed 12 May 2016].
72. For Lodge's involvement with the Red Lions club, see Brown, *The Poetry of Victorian Scientists*, pp. 96–97.
73. Gooday and Bruton, 'Marconi the Monopolist?', 8–9.
74. *First Report of the Proceedings, Recommendations and Transactions of the British Association for the Advancement of Science* (York: Thomas Wilson and Sons, 1832), p. 42.
75. *Freeman's Journal and Daily Commercial Advertiser* (14 September 1899).
76. *Aberdeen Weekly Journal* (21 September 1899).
77. *The Times* (18 September 1899), p. 8.

78. *The Times*, (19 September 1899).
79. *The Bristol Mercury and Daily Post* (13 September 1898).
80. *Pall Mall Gazette* (17 August 1899).
81. *The Sheffield and Rotherham Independent* (18 August 1899).
82. *The North-Eastern Daily Gazette* (19 August 1899).
83. *The British Architect* (15 September 1899).
84. 'Wireless Telegraphy', *The Morning Post*, Interview with Signor Marconi (21 August 1899).
85. Hong, *Wireless*, p. 80.
86. *The Standard* (21 August 1899).
87. *The Penny Illustrated Paper* (26 August 1899).
88. 'At Dover', *The Outlook* 4.85 (16 September 1899), p. 196–197.
89. Guglielmo Marconi, 'The Practicability of Wireless Telegraphy', *The Fortnightly Review* 71:426 (June 1902), 931–941.
90. Ibid., 931.
91. See, for example, ibid., 931: 'The success of my various trials led me to desire some opportunity of testing the practical application of my system on a more extended scale.'
92. Ibid., p. 931.
93. Ibid., p. 932.
94. Ibid., p. 934.
95. Ibid., p. 935.
96. Ibid., p. 936.
97. Ibid., p. 939.
98. Ibid., p. 940.
99. Gooday and Bruton, 'Marconi the Monopolist?', p. 27.
100. See, for example, Hong, *Wireless*, p. 82.
101. Lodge, Oliver. 'Wireless Telegraphy [Letter to Editor]'. *The Times* (31 October 1906), 10B.
102. Cited in Hong, *Wireless*, p. 57.
103. *The Outlook* (23 September 1899), p. 229.
104. 'The Month: Science and Arts', *Chambers's Journal* 2: 104 (25 November 1899), 829–831.
105. 'The New Telegraphy', *Chambers's Journal* 1:49 (5 November 1898), 778.
106. Ibid., 780.
107. Ibid., 778.
108. Ibid., 779.

109. *Report of the Seventieth Meeting of the British Association for the Advancement of Science* (London: J. Murray), p. 639.
110. Oliver Lodge, *Advancing Science: Being Personal Reminiscences of the British Association in the Nineteenth Century* (London: E. Benn, 1931) p. 179.
111. Marconi, 'The Practicability of Wireless Telegraphy', 936.

CHAPTER 7

Reuniting Theory and Practice: The Man of Science and the First World War

At the turn of the twentieth century, the British Association had not yet emerged from the crisis of the 1880s and 1890s. The attacks of the anti-vivisectionists continued; the rise of the scientific entrepreneur, encapsulated in the stellar career of Marconi, increasingly sidelined BAAS activities and initiatives. Annual meetings had long since ceased to be the serious, cutting-edge scientific gatherings they had been in the heyday of the X-Club, and were seen, increasingly as festive 'picnics' for aging men of science and their families.[1] With the self-styled 'practical men' claiming the ground of applied science for themselves, the BAAS, together with university scientists in general, were increasingly associated with 'pure' or 'theoretical research'. In the popular press, this distinction, as we have seen, placed them squarely in the space of the laboratory away from the world. Thus, more so arguably than in the early days of the Association, the man of science was equated with the figure of the isolated scholar.

In the 1830s, the founders of the BAAS had been challenging an opposition between scholar and gentleman. Yet, as we have seen, they were able, to a large extent, to adopt the lifestyle and habits of the gentleman, albeit certainly not without criticism;[2] the boundary between 'pure' and 'applied' science, however, which existed at the beginning of the twentieth century appeared harder to surmount. In the 1830s, we remember, there had been no rejection of applied science on the part of the BAAS. With much of their inspiration coming from the figure of Sir Humphry Davy who pioneered the application of science to real-world problems, it was accepted as part of the BAAS's remit in its early years. This changed in

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the heyday of the X-Club when greater emphasis was placed on science as part of a liberal education, a tool for the formation of masculine character. Increasingly, new technologies and applications of scientific research were developed and publicized outside the British Association. At the start of the twentieth century, then, the status of the BAAS and the man of science continued to be both insecure and unstable.[3]

The growing threat of war with Germany in the first years of the new century did nothing to improve the public image of the male scientist. Since the BAAS's earliest days, the identity of the man of science had been distinguished carefully from the traditional masculine figure of the soldier. On the occasion of the Association's third meeting at Cambridge in 1833, William Sotheby had composed a poem which expressed this clearly:

> But thou, celestial peace, thy olive rear
> That knows no taint of blood, no orphan's tear,
> And wreathe thy sons who league to bless mankind,
> To spread the conquests of the enlightened mind,
> The inert mass of matter to controul,
> And stamp on all the sov'reignty of soul.[4]

Despite David Brewster's claim back in 1850 that men of science constituted Britain's 'true glory and surest defence', and were far more worthy of public esteem than traditional military heroes, he himself acknowledged the huge disparity which remained in terms of national recognition and reward. Brewster admitted that the scientist's 'sunbeam' of glory was 'paler', less immediately inspiring, than those of great wartime leaders; and while advocating the superiority of men of science, effectively argued that scientific masculinity was designed for peacetime and was utterly different from (and, the implication was, incompatible with) a state of war. 'How different are our associations with the tablet of marble or the monument of bronze which emblazon the deeds of the philanthropist and the Sage', he declared.

> … No trophies of war are hung in their Temple, and no assailing foe desecrates its shrine. In the anthem from that choir, the cry of human suffering never mingles, and in the procession of the intellectual hero ignorance and crime are alone yoked to his car.[5]

Just a few years later, Charles Kingsley made the point again. Although promoting the importance of scientific study for the young and praising

the great advances in science since the end of the Napoleonic Wars, he was clear to point out that such advances were only possible in peacetime. When the threat of war loomed, he wrote, the man of science must give way to military men, on whose protection he is ultimately dependent. Writing in 1855, against the background of the Crimean War, Kingsley declared:

> In the last generation, the needs of the world were different. It had no time for butterflies and fossils. While Buonaparte was hovering on the Boulogne coast, the pursuits and the education which were needed were such as would raise up men to fight him; so the coarse, fierce, hardhanded training of our grand-fathers came when it was wanted, and did the work which was required of it, else we had not been here now. Let us be thankful that we have had leisure for science and show now in war that our science has at least not unmanned us.[6]

For Kingsley then, science was a pursuit for peacetime, when men had sufficient 'leisure'. Instantly, we are reminded of the aristocratic ideal of the BAAS in its early days, when science was intended primarily as a genteel pastime. In the context of war, science had nothing to say, no role to play; at worst it might 'unman'. '[C]oarse, fierce, hardhanded training' was once more required, underscoring further the association of science with reclusive scholarship away from the world.

These views were reasserted in the early years of the twentieth century as Anglo-German antagonism worsened. Not only was the BAAS seen as a body unsuited to the military demands of wartime but their members became increasingly suspected of something even worse—potential disloyalty. Despite the recent move to hold annual meetings in the colonies and to cultivate closer ties with the empire, the Association remained strongly wedded to an ideal of scientific internationalism; indeed, it was upon this internationalism that many scientists had built their sense of masculine independence which, they argued, lifted them above the petty concerns of national politics. However, against the background of growing national rivalries and the threat of war, such a tradition looked increasingly unpatriotic, at worst, disloyal and cowardly. Worse still, many prominent figures within the BAAS were viewed publicly as sympathetic to Germany: many had been trained there, including Oliver Lodge.

We saw this connection made earlier in the anti-vivisection row, when Frances Power Cobbe accused the BAAS and the scientific establishment more generally, of rejecting the sensibility of the English gentleman for a foreign ideal of scientific manhood identified with the unfeeling German

physiologist who condoned needless animal suffering. We see it again in the press coverage of the 1899 Dover meeting. A number of newspapers accused the Association of a lack of patriotism following their refusal to cancel the meeting amidst public outrage at France's decision to sentence Alfred Dreyfus, the young Jewish artillery officer, to hard labour for allegedly communicating French military secrets to the Germans.[7] In this case, the scientific cosmopolitanism paraded at Dover seemed to jar with the increasingly tense international environment. One article from the time, published in the *Nottinghamshire Guardian*, poked fun at the high moral manliness of the BAAS, referring to its members as 'liv[ing] on a plane beyond the influence of the passions and prejudices which move ordinary mortals'.[8]

Similar suspicions continued to attach to the BAAS in the period immediately preceding the outbreak of the First World War. Indeed, the context in which many Association members learned that war had been declared reveals the difficulty of their position quite clearly. A large delegation of more than one hundred members was en route by ship to Australia for the 1914 annual meeting. On the one hand, the meeting was designed to strengthen imperial ties. Sir Charles Lucas, former under-secretary for the colonies, had pioneered the idea of a meeting in Australia, following on from the success of the 1905 meeting in South Africa, which had been largely intended to heal the wounds of the recent Boer War. The visit was co-sponsored by the Victoria Branch of the Imperial Federation League with the prime minister of Australia declaring how 'impressed' he and the Australian Government had been 'with the importance of this event' not just 'for the causes of science, and education', but also for 'imperial unity'.[9] On the other hand, the party travelling from Britain was a distinctly international one with a considerable number of German members on board. Indeed, distinguished German scientists had been explicitly requested by the Australian organizers, to lend éclat to the meeting.[10] The participation of the geographer and geologist Albrecht Penck from Berlin, and the famous desert geologist Johannes Walther from Halle, was desired in particular.[11] Many of these foreign guests were close friends of the English colleagues they travelled with.[12]

In the first days after war had been declared, despite the quick establishment of a 'Patriotic Fund'[13] to support the war effort, the attitude of the BAAS delegation to Australia remained distinctly internationalist. Many German delegates encountered problems accessing their funds as banks in Australia refused to receive money from their German counter-

parts. The British Association treasurer, John Perry, intervened personally on behalf of the Association's German members.[14] Many BAAS members even drew on their own funds to ensure their German colleagues were able to return home. Thus, in the case of Professor E. Goldstein of Berlin, John Perry had to give a personal guarantee to the Commonwealth Bank of Australia in the event that the Dresdner Bank would not release the sum requested, which they did not. Asking the British treasury for support, Perry outlined the sense of duty which he and the Association felt towards their German members and why he felt his aiding of Goldstein should not fall under the notice of the recently passed 'Trading with the Enemy Act':

> Great difficulty was experienced by some of the Foreign Members on their arrival in Australia in view of the stoppage of funds … I have been compelled to pay under the guarantee I so gave … I venture to suggest that the transaction is hardly one that was intended to be vetoed under the 'Trading with the Enemy Act' and that it should be recognised that the Ass. [Association] was almost in honour bound to do their best to see that their Foreign Members were not left helpless in an English Colony to which they had proceeded at the invitation of the Association.[15]

In some cases, the help provided went much further than this. Although able to return to Britain, Albrecht Penck could not, for diplomatic and financial reasons, secure safe passage back to Berlin for several weeks. In the meantime, he was invited to lodge at Burlington House, the London office of the British Association, and to 'enjoy all those privileges to which he was entitled for just as long as it might take to resolve his predicament'.[16]

At the same meeting in Australia, it was a German-born scientist, Arthur Schuster, who was also a naturalized British citizen, who was elected as the new BAAS president. The formal election, it is important to note, took place after the outbreak of war had been known. Popular reaction in Britain to this election was profoundly hostile. One piece which appeared in the *English Review* in October 1915, written by a British member of the BAAS, was provocatively titled 'A Germano-British Association and Address'. The article did not mince its words, declaring: 'Hitherto the British Association has been a British institution in constitution and conduct … [I]t is strange that it should cease to be so and fall under alien control in this year of all years, the 85th of its existence, when we are at war with Germany.' The writer of the piece complained that the BAAS general committee 'thoughtlessly accepted' Schuster's nomination in

Australia[17] and that 'in justification, we have had the usual talk of science being international'.[18]

It is as if the writer of the article had read Kingsley's words about the potential of science to 'unman' the nation in war. 'Our scientific men', he wrote, 'have asked us to turn the other cheek to the enemy—we are such weaklings apparently that we have done so'.[19] He condemned their decision 'to cry "science as usual" at such a time' and declared that 'as a body they seem to be emasculate'.[20] Schuster's address to the King, he wrote, 'assuring his Majesty that the members of the Association were anxious to devote all their energies to assisting the Government in … bringing the war to a victorious conclusion' was 'quite unnecessary' as 'professors of science have not the grit in them' needed to fight.[21] Thus, in the early stages of the war, the BAAS suffered from something of a double bind in terms of their public image: firstly, linked as they were in the popular press with the image of the reclusive scholar, they were widely perceived as unfit for the dangers of the battlefield; secondly, their continued commitment to internationalism, to prioritizing cooperation over conflict, even electing a German-born scientist as president, could be (and was) interpreted by sections of the British press as evidence of their unmanly cowardice and lack of patriotism.

'A Fresh Lease of Life'

This sort of reaction from the press did have an effect on the BAAS itself. Increasingly, voices from inside the Association argued that the war should be viewed as an opportunity to prove their usefulness to both nation and empire and to vindicate the collective masculinity of men of science. Unsurprisingly, perhaps, it was the mechanical engineer, and self-styled 'practical man', Henry Selby Hele-Shaw, who wrote to the president, Arthur Schuster, on 19 August 1915 declaring that something needed to be done: The British Association, he wrote, 'does not form, as once it did, the recognised channel of communicating new discoveries and inventions to the world, and is now generally regarded merely as a body holding annual meetings in this country and the colonies at which Scientific men can … attend, with their families, social gatherings'. He went on to argue that the war had the potential to give what he described as 'a fresh lease of life' to the Association. In particular, he thought it offered an opportunity for raising the public profile of the scientist himself as a dynamic national hero. What he recommended, therefore, also had a distinctly

imperial twist. The BAAS must lead the way, he insisted, on 'applying the resources of science directly to handling many of the great problems of the British Empire'. The 'formation of a strong committee' as soon as possible was essential, he argued, to ensure 'the first step is taken towards a work which the truly Imperial character of the British Association so eminently justifies and indeed demands that it should undertake'.[22] Here, we see the context of war helping to bring about a significant change of attitude towards the application of science within the BAAS. Once again, we see the Association stressing science's active, practical role and its national and imperial character over its internationalism.

Much of this drive, as might be expected, focused on proposals for maximizing the natural resources of the different parts of the empire and trying to mobilize them in the conflict with Germany. In December 1915, just a few short months after Hele-Shaw's letter, the BAAS established a special 'Committee of Problems After the War' which asked all sections to address practical issues arising from 'the future effects of the war upon national and imperial welfare'.[23] When asked, Section E (Geography) showed significant interest early on in surveying with a view to harnessing the geological, agricultural, economic and human resources of empire for the war effort; they also looked forward to reorganizing the empire more efficiently after the war, possibly with the addition of former German colonies. Here they may be fairly described as seeking to act as the scientific arm of empire.[24] Section H (Anthropology) likewise expressed an interest in acquiring ethnographic maps of former German colonies 'with a view to possible territorial settlements after the War'.[25] Section A (Mathematics and Physics), which replied in January 1916, urged sectional cooperation (in particular with Section E—Geography) to collect what it described as 'meteorological' and 'geographical' data to support British 'military operations' especially in innovative areas such as aircraft and submarine warfare.[26]

From these somewhat tentative beginnings, as the war progressed and the huge importance of science and engineering to success became clear, confidence grew in the inner circles of the BAAS and members began to think about how they (and men of science more generally) might capitalize on this. 'One of the most striking facts which has been brought home to the country as the war has proceeded', Section G (Engineering) recorded in early 1916, 'is, that it is very largely a struggle of scientists and engineers and that the success or failure of a country in warfare is dependent to a large extent on the development of scientific research, and the

practical application of the results of this research.' As we see from this, the context of war helped to bring about a significant rapprochement between so-called 'theoretical' and 'practical' men within the BAAS. Indeed, those working on 'pure' and 'applied' science increasingly came together to argue for the importance of science as a whole. This development certainly provides a sharp contrast with the tone of Frederick Bramwell's address when president of the BAAS in 1888—an address which reflected the deep divisions between the engineering section and the other parts of the Association at that time.[27] With a view to securing science's new-found position and continued high levels of government support after the cessation of hostilities, Section G argued that the 'economic struggle which will follow the War will still likewise depend to a great degree on scientific development, and an application of the scientific method to every department of our national life'.[28] They claimed that the BAAS as an organization had succeeded in carving out for itself a unique position in British national life—'[D]uring its long period of public work [it] ha[s] been in touch with all classes of the community, and ha[s] gradually extended its sphere of activity not only throughout the whole of the British Isles, but through the whole of the British Empire'.[29]

Against the background of war and a greater role for science, we begin to see a more confident tone developing within the BAAS when discussing its own position. By 1916, it had largely succeeded in shedding its 'effete' and 'esoteric' image and could, with some justification, claim to be widely 'recognised as treating the problems of the day in a scientific manner, though at the same time from a practical point of view'.[30] From a body that was generally seen at the start of the war to be slipping slowly but surely off the public radar, lacking modern relevance, the BAAS could argue by 1916 that Britain's very 'national welfare' would 'largely depend on the energetic scientific development' of its resources.[31]

Science and Education: Shaping the Scientist of the Future

We see this rapprochement between theory and practice, not only in those BAAS sections focused on the application of science, but also in those which were less closely connected with technological development. This is arguably most visible in the case of the Association's newest section—L (Education)—which had been established in 1900.[32] Despite sharing Huxley's vision of science as part of a liberal education, designed primarily

to shape character rather than to provide a technical training, the organizing committee of Section L released a memorandum in June 1916 which echoed the argument of Hele-Shaw, discussed earlier, that the war should be seen as a valuable opportunity to raise the profile of science. Thus, it lamented the dwindling public engagement with science in recent years and called for a sustained campaign for the 'Popularisation of Science through Public Lectures'. 'Much more remains to be done', it urged, 'if advantage is to be taken of the opportunity which the War has given of showing that scientific method and thought are essential factors of modern progress.'[33]

Key to this, the leaders of Section L argued, was the need to raise government and public support for science education in British schools and universities. In early 1916, an independent committee was established by E. Ray Lankester, the evolutionary biologist and long-standing BAAS member, which worked closely with Section L to inquire into the 'Neglect of Science', particularly in the British education system and civil service. 'The continued existence of this country as a Great Power', their first report concluded, was dependent upon finding men marked not only by 'courage, devotion and self-sacrifice' but who had also 'received a scientific training'.[34] This statement was a reflection of the enormous importance which developments in science and industry had come to play over the course of the war. The committee's report acknowledged the widespread view that the war had started badly for Britain because '[n]ot only are our highest ministers of state ignorant of science, but the same defect runs through almost all the public departments of the Civil Service'. The committee attributed this to a persistent prejudice against the natural sciences existing throughout the British education system, culminating at university level where there was still 'to some extent an indifferent, not to say, contemptuous attitude towards them'.[35]

The efforts of the 'Neglect of Science' committee clearly bore fruit as just a few months later, in the summer of 1916, the government announced the appointment of its own 'Committee to enquire into the position of science in the education system of Great Britain' with a view to its reconstruction to meet the peculiar needs of war.[36] As the president of Section L, William Temple, commented in his address to the Newcastle meeting later that year, 'the lessons of the war have begun to make an impression on the powers that be'. Like the BAAS itself, he declared, they have finally realized the need for an education system which promotes both 'the advancement of pure science, and also the

interests of trade, industries, and professions dependent on the application of science'.[37]

In the same year, the BAAS itself formed a committee, chaired by the biologist, R. A. Gregory, to examine the current provision of science education in the country's secondary schools. Here too, we see a significant closing of the gap between 'practical' and 'theoretical' positions. While the overarching aim remained a liberal education and the shaping of character, teaching science on the old literary model, preferred at the universities, was rejected as outmoded and impractical. As the committee's report on 'Science Teaching in Secondary Schools', published in 1917, concluded, it was not enough 'merely to provide information about natural objects and phenomena';[38] pupils must be placed 'so far as possible in the attitude of discoverer';[39] they must learn to emulate active men of science in their own investigations. A sharp contrast was drawn between the traditional 'descriptive' method of science teaching used in schools and new, dynamic approaches which favoured practical investigation and experiment in the laboratory.[40] The 'strong classical tradition' of the public schools, which still 'educate the majority of future statesmen' was blamed for promoting a dismissive attitude towards science and preparing boys badly for the challenges of war and of modern life in general.[41]

Above all, an integrated approach was recommended, liberal in aim, but practical in method. In contrast to the 'mere imparting of facts' which characterized girls' science education, the report claimed, boys must be encouraged to engage in 'a genuine *pursuit* of knowledge', which although guided by the teacher, should emulate 'the historic activities of scientific minds working at their best'. These historic activities were depicted using strikingly masculine imagery. Knowledge was something to be 'pursued', with a view to 'exploit[ing] the forces of nature for [man's] own purposes', to render her 'the handmaid of man'.[42] Boys, the report recommended, should be taught that the scientific mind was characterized by a 'craving for theoretical completeness and unity', for a 'mastery' of nature which may 'reach the force and volume of a passion'.[43] Scientific instruction ought to be serious in tone and support the development of masculine character. 'A science lesson should not', the report cautioned, 'degenerate into a display of fireworks or sentimental vapourings about the "marvels of nature".'[44] Against the background of war, the emphasis was placed firmly on active experimentation designed to produce results of practical utility, rather than of mere 'academic interest'. Thus, what had previously been 'regarded as "applications" of scientific principles, to

be taught if time and the demands of a public examination allow', were henceforth to be 'treated as the foci of interest, from whose study the pupil's knowledge of scientific principles is to emerge'.[45]

The report's authors sought to connect science closely to the everyday world of boys, to remove the still prevalent notion that science was a subject fit only for the few, those with a 'special type of mind'. There needed to be more masculine thrill built into science teaching if sufficient numbers of boys were to be recruited to serve the nation as scientists in a war whose duration was uncertain. 'There should be more of the spirit, and less of the valley of dry bones', the report concluded.[46] To achieve this, its authors recommended nothing less than the establishment of a masculine cult of scientific heroes in schools of all types. Lessons were needed 'to direct attention and stimulate interest in scientific greatness and its relation to modern life'. All boys 'should be given the opportunity of knowing … the lives and works of such men as Galileo and Newton, Faraday and Kelvin, Darwin and Mendel'. 'One way of doing this', it suggested, was through lessons in the 'history of science, biographies of discoverers, with studies of their successes and failures'.[47] 'Inspiration', the report declared, 'is everything.' And the urgency of the war 'has given the opportunity of doing this more effectively than before'.[48] For the first time, we see great scientific heroes from the past being appealed to as appropriate models of masculinity in wartime.

Invoking the 1860s campaign of Tyndall and Huxley for science lessons to be introduced into public schools, the report's authors claimed that boys must 'come into contact again with striking experiments, the history and development of discoveries, the lives of the great, in fact, to the romance of science'. A work by the British Association's own Oliver Lodge—*Pioneers of Science*—was explicitly recommended as an inspiring textbook for boys in secondary schools. 'Lectures or exhibits' were to be created for boys 'to illustrate the life and works of a great investigator—men like Faraday, Dalton, Darwin, Pasteur'.[49] Ideally such exhibits would be rendered permanent through the creation of a dedicated 'museum of history' in each school which would contain 'a gallery of the world's leading workers and pioneers, that something may be learnt of their lives and what they looked like'.[50] The physical appearance of scientists emerges as particularly important here. The BAAS worried that boys had been brought up to think of scientists as weak, sickly men, living and working in retired isolation. Portraits of active, physically fit men, working outdoors in the pursuit of their science were seen as vital to countering that image.

Under the conditions of war, we see a return to the balance struck by the X-Club in their work on educational reform, between action and utility on the one hand, and character formation on the other. Hard work and action in the world once more became the wished-for attributes of the student of science; at the same time, '[w]orkers and pioneers' became the templates for the ideal man of science.

While such strategies were important for encouraging more boys to specialize in science, they were also vital, the report argued, for producing men fit to serve in Britain's armed forces. Teaching by active experiment and independent investigation, backed up by a thorough knowledge of past scientific heroes, would ensure that a boy would develop into 'an accurate, observant, reasoning, and adaptable man, with bodily, mental, and spiritual faculties developed to the fullest possible extent'.[51] As we have seen, the BAAS did not shrink from describing the war as a welcome opportunity for raising the public profile of science and, in particular, for promoting its value in shaping the type of masculine character desirable in war. 'Terrible as the present war is', a BAAS report from 1917 on 'Money-Scales and Weights' declared, 'there is no doubt that it has had, and will have, many good results'. 'To the members of the British Association', it continued, 'it must be more than gratifying to find that at last the value of science is recognised.' More than this, it mused on the potential shift in public respect for men of science, and the masculine reputation of the scientist, in particular, which the war might bring about. 'The war has done more than give a greater appreciation of science: it has given a chance to men who would not otherwise have made themselves felt in the work of shaping our destiny' and will do much to 'remove … prejudices' against men of science.[52] It is as though they began to see the potential after the war for permanently altering the public association of science with reclusive scholarship, for finally achieving the secure masculine status which had previously eluded them.

Adapting to Peacetime: Science as Manly Citizenship

So, to what extent was the BAAS able to capitalize on the opportunities it believed the war provided for fostering the public recognition of science and the scientist? Hopes were certainly high at the end of the war. On 18 December 1918, William Abbott Herdman, Professor of Natural History at the University of Liverpool, wrote to O. J. R. Howarth, Assistant Secretary of the British Association, urging the BAAS to make the most

of their raised public profile during the war. 'We should try and make a big beat-up of scientific men', he wrote, 'and try and have an unusually important meeting for our first after the war.'[53] The tone adopted at British Association meetings held immediately after the war was certainly confident. At the gathering in 1919, the president's address referred to the manifold 'services rendered by the Sciences during the War' and this was mirrored in a bolder approach towards the government in terms of urging them to increase funding for scientific research.[54] In a resolution adopted at the 1919 meeting in Bournemouth and sent to the Prime Minister and Chancellor of the Exchequer, the BAAS stated their hope that the government now 'recognise[d] that the successful issue of the War has sprung from the efforts of scientific men' and shared 'the conviction that the well-being and security of the nation is dependent on the continuous study of such matters'.[55] There was a need, they urged, for much closer cooperation between civil and military science in the future and this recognition was shared on both sides with the navy admitting it was now 'keenly alive to the supreme importance of research'.[56] On both sides, too, there were ominous references to being much better prepared 'next time''[57] and both acknowledged the need for universities to be much more closely involved in developing defence technology; to win in future, they must 'bring the full scientific knowledge of the country to bear'.[58] Scientists were now (and really for the first time) acknowledged to be central to the nation's defence.

Building on this success, the BAAS asserted itself as a uniquely qualified judge of national strength, fitness and masculinity. The Association had a long-standing interest dating back to the later years of the nineteenth century in collecting and analyzing statistical data on the physical stature and health of the British population.[59] In March 1919, it pushed for access to thousands of statistics collected by the War Office and held by the Ministry of National Service on the physical health of British men who had entered the armed forces to fight in the First World War, or, in the words of the BAAS, the 'physical condition of the manhood of all parts of England'.[60] With the aim of developing strategies to improve the standard they found, various sections, especially E (Geography) and H (Anthropology), lobbied hard for access to a variety of unprecedented ethnographic data gathered in the course of the war. Included in these were ethnographic studies, photographs and charts assembled by the Germans 'in their former colonies'[61] as well as a wide range of photographs and accompanying information on 'age, physique, residence and occupation'

collected by the British and their allies from individuals applying for travel permits during the war years. The assembling of this data was intended to help establish a context within which to more accurately measure and assess British 'physical' and 'racial' fitness.[62]

Another legacy of the war, visible in the early interwar period, was an even closer identification between the British Association and the empire. The relationship, however, was articulated from a position of considerably more confidence than when the BAAS decided to hold its first 'overseas' meeting in Montreal back in 1884 in response to its falling popularity and increasingly virulent attacks from anti-vivisectionists. From 1921 onwards, then, the BAAS played an important role in helping to organize the British Empire Exhibition held in London in 1924 and 1925. 'Every endeavour will be made', the council of the Exhibition stressed in a letter to the BAAS president and general committee, 'to illustrate the manifold relations between science in all its branches and imperial development.'[63] The Exhibition's organizers were clear about their desire to extend and strengthen the closer relations established between science and the empire and between Britain and her colonies during the war. The goal, as stated in the official handbook, was 'to create an atmosphere favourable to more rapid and complete trade developments, to show the wealth of our Imperial assets … and to foster the spirit of unity which animated our peoples during the War'. The effect of the war in terms of raising the public and political profile of science and the scientist stretched into and indeed grew in strength during the interwar years. 'The lesson learned in the hard school of experience during the War', the handbook continued, '—that we ought to take advantage far more than we have done of the many different soil, climates, and possibilities which are to be found in our widespread territories—will be enforced by the exhibition, not at all with the idea of furthering any political policy, or of separating ourselves from the comity of nations, but simply as a measure of self-protection and mutual profit.'[64]

The natural concomitant of this move to improve the way in which the natural resources of the empire were harnessed for its defence was the development by the BAAS in the interwar years of an educational programme designed to increase the number of trained scientists. At the same time, this programme aimed to foster a particular notion of manly citizenship among schoolboys, which took the man of scientist for its primary model. The origins of this scheme can be found in Lankester's 1916 'Neglect of Science' committee which argued that raising the profile of

science among boys in Britain's secondary schools would ensure that 'the professional workers in Science would increase in number and gain in public esteem'. 'Public opinion', they believed, would then 'compel the inclusion of great scientific discoverers and inventors as a matter of course in the Privy Council, and their occupation in the service of the State'.[65] If we remember, the British Association's own report on 'Science in Secondary Schools' from 1917 had complained that science teaching was not passionate or independent enough and did not engage sufficiently with an inspiring history of masculine scientific achievement. After the war's end, a number of schemes designed for use in schools were recommended to rectify the situation, to actively construct the history of science as that unfolding of 'masculine reason', so well described by Dena Goodman in her work on the Enlightenment.[66]

One of the chief strategies which the BAAS developed in the early interwar years for enthusing children, especially working-class boys, with this ideal of science-citizenship was the promotion of carefully chosen series of pictures for use in schools. The British Association's 'Educational Pictures' committee was appointed in 1920 and in the minutes of their meetings we read of the committee's attempts to choose portraits which inspired this ideal of the hard-working, patriotic citizen-scientist. 'Prof. Roaf',[67] we are told, 'showed [the committee] a book containing a portrait of Harvey which was regarded as a good example of what a portrait should be if it was to be suggestive and inspiring as well as historical.'[68] In particular, they wanted pictures which showed men of science going about their everyday work. 'John Dalton Collecting Marsh Fire Gas', painted by Ford Madox Brown in 1887, was particularly commended among a series entitled 'Scientific Worthies' as it showed the early nineteenth-century chemist and scion of the BAAS to be a practical man of work. C. E. Browne, one of the secretaries of Section L, also produced a selection of portraits of men of science for use in schools and the committee recommended that his selection be 'expanded … to include all portraits of scientific men in the National Art Gallery' and this was accepted.[69]

Likewise, a series of photographs taken by Herbert Ponting depicting the successful British Antarctic Expedition of 1910–13 was recommended for the same reasons—its depiction of brave and daring men of science, harking back to the Livingstone model of the imperial explorer-scientist popular in the late nineteenth century.[70] Indeed, the committee recommended a particular series of images entitled 'Makers of History' which included great men of science like the explorer David Livingstone

alongside military heroes such as Drake and Nelson.[71] In this selection, in particular, we see an attempt to render permanent the recognition achieved by men of science during the war. Anthropological images depicting the different 'races' of man were also recommended[72] as was a series entitled 'Pictures of War Work in England' which showed striking images of engineers working on various pieces of war technology and architecture. This series, in particular, was identified as containing 'excellent examples of the type [of image] required'. Images without human involvement, such as a series of prints depicting bridges which came before the committee's notice, were rejected as 'coldly magnificent' but lacking 'the human element' needed to stimulate manly emulation in boys.[73]

Adapting to Peacetime: Reviving Internationalism

However, the paradox at the heart of scientists' identity and conception of themselves as men remained after the war was over; while, in some ways, they were clearly moving closer to the state and to a notion of patriotic masculinity, internationalism, which had long been a crucial signifier of their masculine independence, retained its importance. Just as they sought to use their raised public profile to benefit from state support and funding, the BAAS also worked quickly after the end of the war to reassert itself as the chief arbiter of international scientific and educational exchange in Britain, a role which distanced itself from, and raised it above, the state. As well as working with the Universities Bureau of the British Empire which had been founded in 1913,[74] shortly before the outbreak of war, within a few months of the conflict ending, in early 1919, the BAAS took the lead in coordinating a new scheme for Anglo-Scandinavian student exchanges.[75]

There was also felt to be a certain notion of heroism, neither exclusively national nor international in character, in assuming responsibility for reconstructing the international scientific community. At the Bournemouth meeting in 1919, the BAAS referred to the 'necessity for organising the intellectual classes [of all countries] to maintain and uphold the freedom of science' and declared that Britain was ready to lead the way.[76] Taking on the task of rebuilding civilization and, by implication, defending it, fitted well with Britain's sense of its imperial responsibilities around the world. In the early part of 1920, the British Association, together with other constituent bodies of the Conjoint Board of Scientific Societies, declared its commitment to working for 'a mitigation … of the

appalling conditions which … prevail in the scientific world' in Germany and Austria. They argued that 'British scientists would be in general agreement that, from more than one point of view, there is much to be said for our helping them [Germany and Austria] to in some measure restore normal conditions of life in scientific circles.'[77] They read in detail extracts from the German-language press detailing the near-impossible conditions under which German and Austrian scientists were struggling—in particular, hyperinflation, making scientific equipment, books and journals much too expensive to purchase.[78]

In calling for help, German and Austrian scientists did not shy away from drawing heavily on the language of scientific internationalism to prick the consciences of colleagues in other countries. Fritz Haber, Director of the Kaiser Wilhelm Institute for Physical Chemistry in Berlin, lamented that, if unaided, German scientific institutes would become as 'the Venetian palaces, which stand empty, and present to the visitor an interesting picture of past importance'. 'In former times', he wrote, 'the culture of Science in Germany was a work of art … But if the continuity of the circle of humanity which devotes itself to the cause of Science is broken, tens of years will not suffice to make good the destruction thereby brought about.' Moreover, Haber argued, it would entail a loss not just for Germany and Austria but for the whole world. Idealism itself would be 'dead and buried for an indefinite time'.[79]

These pitiful conditions were verified when Professor Everett Skillings, representing those interested in establishing an 'Anglo-American University Library for Central Europe', visited eleven universities in Germany and Austria in April and May 1920. He noted terrible conditions including malnutrition and starvation among the remaining lecturers and professors, describing 'people hungering in mind and soul for contact with the intellectual world outside'.[80] 'They seem bewildered by despair', he wrote, literally unmanned and 'broken in spirit'. 'The immediate necessity', as he saw it, was 'to inspire hope'. In his report, we see how quickly ideals of masculinity endorsed by scientists were shifting; in this context at least, a patriotic notion of military glory was for wartime; a society at peace demanded something different, derived from alternative, Christian models of manliness. 'The question of helping is quite apart from our attitude towards them during the War', declared Skillings. 'Here is one of the hardest tests which practical Christianity has to face.'[81]

This desire to help German and Austrian scientists, whose work had been so adversely affected by the war, was realized in a number of con-

crete proposals actively supported by the BAAS, including the project to establish an Anglo-American University Library, already mentioned.[82] The chief aim of the Library was to go some way towards replacing those journals and books lost or destroyed in the war. It was also intended to act as a symbol of the important role of science and scientists in peacetime; the Library's executive committee wrote of their hope for an 'uplifting of mankind' through 'the encouragement of learning'. The Library was to represent 'the outstretched Hand of Fellowship' which they hoped their German and Austrian counterparts would 'grasp … in the same spirit in which it is given'.[83] In May 1920, a further committee was appointed to 'fix the needs of German science in respect of foreign educational literature, and take care of the disposition of books and exchanges in Germany and Austria'. It was hoped that the Library would 'serve as a central point for endeavours towards a rebuilding of the international spirit of culture … to help in reconciling the intellectual world'.[84] This and similar projects championed by the BAAS were designed to underscore a new peacetime role for the scientist, as the architect of international peace in the post-war environment. 'The reconciliation among the peoples can only come through the cultivation of mind and spirit', the Library's executive committee declared, 'and it is clear that the great teachers of the world, by the free interchange of ideas, must be the leaders in such an endeavour.'[85]

We should not forget, however, that while this symbolic reaching out to German and Austrian scientists was intended to repair the damage caused to the international scientific community by the war, there were also strong nationalist reasons, on the part of the Allies, for offering to help in this way. 'By thus taking the initiative in extending the hand of friendship to colleagues in foreign countries, whether former enemy countries or not, where the exchange conditions hinder a resumption of study and research, British and American scholars are seizing a timely opportunity of helping to heal the wounds of the war.'[86] Such was the justification which the executive committee of the proposed Anglo-American Library offered to its supporters. Unsurprisingly, perhaps, the response from scientists in Germany and Austria was resoundingly positive. From colleagues in Austria came the view that the establishment of the Library would represent 'a welcome beginning to the linking up of old associations' and they pressed all countries for donations 'so that this great work of international reconciliation and public benefit may at once take effect'.[87] So dire was the economic state of affairs in Germany and Austria that scientific internationalism offered itself soon after the close of the war as a discourse (per-

haps the only one) capable of resolving the situation. 'The brain-workers of Austria appeal to their friends and fellow-workers in all countries', one appeal from Austrian scientists ran. 'There is imminent danger of our being separated from the scientific and technical world', it declared, 'a thing which would imperil the unity of civilisation … for culture and civilisation are the property of all nations alike, and must be furthered by all.'[88] Following in this vein, the *Zentralanstalt für Meterologie und Geodynamik* at Vienna in its own appeal for assistance, written on 2 December 1920, described itself as being 'to a certain extent the common property of all civilised nations on earth … in whose survival all are interested'.[89]

An important part of championing internationalism and establishing a successful new role for science involved presenting men of science themselves as role models, as architects of the post-war peace. Drawing on the proposals put forward in the 1917 report on 'Science in Secondary Schools' and by the Educational Pictures committee in 1920, in particular the need for much greater emphasis on an inspiring history of scientific progress, the interwar years witnessed the emergence of a very different model of scientific masculinity—the male scientist as the ideal citizen of the future. P. B. Showan's *Citizenship and the School* (1923) highlighted the recently published findings of the British Association's committee on 'Training in Citizenship' and stressed the important role which science had to play in developing inspiring models of manly citizenship suitable for peacetime.[90] Indeed, Showan argued that science had now earned the right to replace 'history' as the chief subject for imparting the values of citizenship to the next generation. '[S]chool history at present', he wrote,

> is so largely concerned with … kings, rulers, men of war and of action—that there is a danger of over-working the natural sense of hero-worship, or, if not of over-working, of misdirecting hero-worship. There is no doubt that men of valour and prowess in battle make a more ready appeal to boys than leaders of thought or of science. This is only to be expected; but if a civic bias is given to the teaching, and lessons of history are chosen to show the debt that nations owe to men of science and to leaders in peace, then this helpful hero-worship can be directed—'Peace hath her victories …' Eton will be proud of Lord Roberts, V.C., and East Ham School will be proud of Jack Cornwell, V.C., as long as boys are boys; but teachers must correct the balance, for men like Newton, Kelvin and Pasteur must not lose their 'due meed of reward'. The war has altered our conception of patriotism, and at last we see that the true criterion of love of country is applied social

> service—giving the best to the community in time of peace no less than in war.[91]

'Thus', he continued,

> … a science master who fails to give his pupils some account of the life and work of the greater scientists whose work may be under study in his lecture-theatre or laboratory, is not making the most of his subject or of his opportunities for imparting knowledge which is of definite value as a preparation for citizenship. Some knowledge of Boyle, Newton, Ohm, Kelvin as men, rather than mere names, must make the subject more interesting, quite apart from any value such knowledge may have in helping a pupil to form a habit of mind which disposes him to judge men's worth in terms of their services to mankind.[92]

To illustrate for his readers how this might be done in practical terms and with what effect, Showan recounted the example of a science master at West Square Central School, Southwark, who

> has made cards which are admirably illustrated and designed. Each one shows a picture of a famous scientist, his nationality, birthplace, dates and period, his school and work-place, and the discoveries and work for which he was famous. When the work of any of these men of science is under study, or if it is the anniversary or centenary of any particular scientist, then his picture and record are exhibited in the calendar or roll of honour and a short talk is held about him and his work. The pupils themselves often volunteer to execute these cards in their spare time, and the frame and cards form perhaps the most treasured and certainly not the least valuable exhibit in the laboratory.[93]

Exploring the ways in which the British Association responded to the outbreak of war in 1914, how they developed new public roles for science and the scientist against the background of war and, again, in peacetime, points to a considerable (and underestimated) flexibility and determination on their part. As we saw earlier, on the eve of war, the public profile of the British Association had reduced considerably from the heady days of the X-Club and the scientist was increasingly viewed once more as a somewhat effete and esoteric figure, isolated from the cut and thrust of the real world. By the middle years of the war, the situation had changed considerably. Within a relatively short space of time, the Association had decided to view the war rather as an unprecedented opportunity to prove

the value of scientific research and men of science, more broadly, to the welfare of the nation and empire. They sought to reinvigorate the public image of science and the male scientist through the reuniting of theory and practice.

By the end of the conflict, the BAAS had developed a much closer, more effective relationship with the British government and with the armed forces, with a clear public acknowledgement of the value of science for the defence of the country. In any future war, British science would be at the heart of decision making. This renewed relevance and heightened public profile did not dissipate, however, in peacetime. It is strong evidence of the adaptability of the British Association in the inter-war years that they were able, as an organization, to refashion themselves successfully once again in the very different environment of peacetime. As we have seen, they aspired to nothing less than leading the development of post-war culture, urging a speedy return to the internationalism which they felt had been so important to safeguarding their independence in the past. While changing adeptly in response to altered circumstances, they also developed a clear long-term vision. Through carefully designed educational programmes, both at home and abroad, the BAAS sought to ensure the long-term vitality and necessity of science for modern life. By the mid-1920s, the man of science had emerged not only as a viable war hero, the preserver of nation and empire, but also, and perhaps most significantly, as the preferred model of masculine citizenship in peacetime.

Notes

1. BL Dep. BAAS 96, pp. 2–4. See also Howarth, *The British Association for the Advancement of Science: A Retrospect*, pp. 90, 120.
2. See Chapters 3 and 4.
3. Cf. the work of Steven Shapin who has argued that the conceptual categories of 'pure' and 'applied' research were 'radically unstable' at this time. See Steven Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation* (Chicago: University of Chicago Press, 2008), p. 97.
4. William Sotheby, *Lines Suggested by the Third Meeting of the British Association for the Advancement of Science, held at Cambridge, in June 1833* (London: J. Murray, 1834), p. 3.

5. [Brewster], 'The British Association for the Advancement of Science', p. 285.
6. Kingsley, *Glaucus*, p. 9.
7. See, for example, *The Belfast News-Letter* (14 September 1899); *The Glasgow Herald* (14 September 1899); *Nottinghamshire Guardian* (16 September 1899), p. 4.
8. *Nottinghamshire Guardian*, (16 September 1899).
9. BL Dep. BAAS 232, p. 63.
10. BL Dep. BAAS 232, p. 167.
11. BL Dep. BAAS 237, p. 22.
12. George William Lamplugh, for example, made special arrangements to travel together with his good friend Albrecht Penck. See BL Dep. BAAS 234, p. 240.
13. See BL Dep. BAAS 237, p. 125.
14. BL Dep. BAAS 237, p. 111.
15. BL Dep. BAAS 237, pp. 135–136.
16. G. L. Herries-Davies (ed.), *Whatever is Under the Earth: The Geological Society of London, 1807 to 2007* (Trowbridge: The Cromwell Press, 2007), p. 221.
17. A British Member, 'A Germano-British Association and Address', *English Review* (October 1915), p. 328.
18. Ibid., p. 329.
19. Ibid., p. 329.
20. Ibid., pp. 329–330.
21. Ibid., p. 330.
22. BL Dep. BAAS 96, pp. 2–4.
23. BL Dep. BAAS 96, pp. 2–4; 100; 117.
24. BL Dep. BAAS 96, p. 100. For more on Section E's (Geography) involvement in the war effort, see Charles Withers, *Geography and Science in Britain, 1831–1939: A Study of the British Association for the Advancement of Science* (Manchester: Manchester University Press, 2010).
25. BL Dep. BAAS 96, p. 114.
26. BL Dep. BAAS 96, pp. 94–95.
27. For Bramwell's address, see p. 156.
28. BL Dep. BAAS 96, p. 110.
29. BL Dep. BAAS 96, p. 111.
30. BL Dep. BAAS 96, p. 111.
31. BL Dep. BAAS 96, p. 111.

32. On the foundation of Section L (Education), see Peter Collins, 'The Origins of the British Association's Education Section', *British Journal of Educational Studies* 27:3 (October 1979), pp. 232–244.
33. BL Dep. BAAS 96, pp. 62–63.
34. BL Dep. BAAS 96, p. 196.
35. BL Dep. BAAS 96, p. 196.
36. BL Dep. BAAS 96, p. 199.
37. *Report of the Eighty-Sixth Meeting of the British Association for the Advancement of Science; Newcastle-On-Tyne: 1916* (London: John Murray, 1917), p. 376.
38. 'Science in Secondary Schools' in *Report of the British Association for the Advancement of Science 1917* (London: John Murray, 1918), p. 124.
39. Citing the words of the chemist, Henry Edward Armstrong, given in earlier BAAS reports of 1889 and 1890. 'Science in Secondary Schools', p. 126.
40. Ibid., p. 137.
41. Ibid., p. 130.
42. Ibid., p. 135.
43. Ibid., pp. 135–136.
44. Ibid., p. 136.
45. Ibid. p. 137.
46. Ibid., p. 140.
47. Ibid., p. 140.
48. Ibid., pp. 155–156.
49. Ibid., p. 157.
50. Ibid., p. 158.
51. Ibid., p. 173.
52. Ibid., p. 228.
53. BL Dep. BAAS 96, p. 172.
54. BL Dep. BAAS 96, p. 319.
55. BL Dep. BAAS 96, p. 331.
56. BL Dep. BAAS 96, p. 342.
57. BL Dep. BAAS 96, p. 347.
58. BL Dep. BAAS 96, p. 358.
59. BL Dep. BAAS 96, p. 229.
60. BL Dep. BAAS 96, pp. 215; 229–230.
61. BL Dep. BAAS 96, p. 274.

62. BL Dep. BAAS 96, pp. 258–259.
63. BL Dep. BAAS 97, p. 144.
64. BL Dep. BAAS 97, p. 149.
65. BL Dep. BAAS 96, p. 196.
66. See Goodman, *The Republic of Letters*, p. 3.
67. This is Herbert E. Roaf, Professor of Physiology at the University of London.
68. BL Dep. BAAS 377, p. 190.
69. BL Dep. BAAS 377, p. 200.
70. BL Dep. BAAS 377, p. 191.
71. BL. Dep. BAAS 377, p. 192.
72. BL Dep. BAAS 377, p. 193.
73. BL Dep. BAAS 377, p. 199.
74. BL Dep. BAAS 377, p. 111.
75. BL Dep. BAAS 377, p. 110.
76. BL Dep. BAAS 377, p. 111.
77. BL Dep. BAAS 97, p. 4.
78. For a selection of extracts from the German-language press which the BAAS read, see BL Dep. BAAS 97, pp. 19–31.
79. Extract from the *Berliner Tagesblatt* (7 March 1920), BL Dep. BAAS 97, p. 19.
80. BL Dep. BAAS 97, p. 34.
81. BL Dep. BAAS 97, p. 42.
82. The key links between the Anglo-American Library project and the BAAS were the physicist and former BAAS president (1909), J. J. Thomson and the physicist, Frederick Alexander Lindemann.
83. BL Dep. BAAS 97, p. 14.
84. BL Dep. BAAS 97, p. 14.
85. BL Dep. BAAS 97, p. 43.
86. BL Dep. BAAS 97, p. 44.
87. BL Dep. BAAS 97, p. 44.
88. BL Dep. BAAS 97, p. 48.
89. BL Dep. BAAS 97, p. 52. '… bis zu einem gewissem Grade ein Gemeinheit aller kultivierten Nationen der Erde … an dessen Bestand sie alle interessiert sind'.
90. It is remarkable that the contemporary importance attached to science receives very little attention from historians of citizenship in the interwar years. See, for example, Brad Beaven and John Griffiths, 'Creating the Exemplary Citizen: The Changing Notion

of Citizenship in Britain 1870–1939', *Contemporary British History* 22:2 (2008), pp. 203–225.

91. P. B. Showan, *Citizenship and the School* (Cambridge: Cambridge University Press, 1923), p. 14.
92. Ibid., pp. 25–6.
93. Ibid., p. 26.

Conclusion

In Chapter 1, it was remarked that the masculine status and authority of the scientist has rarely been questioned. Indeed, the ascent of the male scientist in public esteem has long appeared one of the great success stories of modern history. Even feminist historians of science, who have focused their attention on the marginalization of women within the world of natural knowledge, have shared an assumption about the security of male scientific authority. This has, on occasions, actually served to reinforce the subordination of women by unnecessarily reifying the masculine power of men of science. It was likewise suggested that feminist histories tend to maintain that gender as a category of analysis is relevant to a study of male scientists only when they are in a situation directly confronted or threatened by women. As scholars working in the history of masculinity have demonstrated, distinctions of gender have been just as important for marking differences between men in the past. Indeed, a focus on the self-fashioning of men of science, as this book aims to show, reveals the deliberately constructed and artificial nature of male scientific authority.

The work of the historian of science, Steven Shapin, was particularly highlighted in Chapter 2, which focused on the changing public image of the man of science, or natural philosopher, in the early modern period. Shapin is one of very few scholars to question (albeit without an explicit focus on gender) the powerful and authoritative image of the male scientist encountered in the historiography. As Shapin demonstrates, the man of science, throughout the seventeenth and eighteenth centuries, was frequently associated with the figure of the effeminate and reclusive scholar;

H. Ellis, *Masculinity and Science in Britain, 1831–1918*,
DOI 10.1057/978-1-137-31174-0

and this was in spite of the efforts of Francis Bacon and, later, the Royal Society to align him rather with the more socially and culturally powerful figure of the gentleman. Following on from the work of Shapin, it was suggested that this link between the isolated scholar and the man of science survived well into the early part of the nineteenth century and played an important role in the so-called 'Decline of Science' debate which castigated the Royal Society and produced conditions so favourable to the rise of the British Association.

In Chapter 3, we explored the early nineteenth century as a time of transformation in ideals of the man of science. New images of the male scientist as poet and hero emerged under the cultural influence of Romanticism and the changed social and political conditions following the Industrial Revolution. The chemist, Humphry Davy, it was suggested, epitomized these developments and we looked in detail at how he came to function as an important inspiration for the fledgling BAAS after their foundation in 1831. Seeking to transform the public image of the man of science, from an effeminate and reclusive scholar into a fashionable gentleman, the BAAS seized on the example of Davy, who combined a stellar scientific career and reputation for applying research to real-world problems with an aristocratic lifestyle. Another advantage of Davy as a model was his interest in reviving a Baconian notion of science as a collaborative effort, dedicated to producing results of practical utility. More than any other thinker, Bacon inspired the BAAS's vision of a reformed science, where the individual man of science subordinated his own interests and ambitions to the good of the collective whole. The chapter then looked in detail at the ways in which the Association sought to institutionalize an aristocratic ideal of sociability, patronage and display through its annual meetings. The fact was particularly stressed that science, contrary to the assumption of many historians, did not enjoy a position of power in 1831, but was rather viewed as a parvenu set of disciplines lacking in cultural authority. The decision of the BAAS to court noble patrons and emulate aristocratic sociability in the 1830s was a strategic one, reflecting the relative weakness of the man of science as a masculine role model in the early nineteenth century.

Chapter 4 focused on the gendered criticism directed at the British Association and its ideal of the gentleman-scientist in the first decade of its existence. Most historians who have written about the BAAS have tended to minimize the importance of these attacks, claiming that the Association was generally successful in transforming the public image of the scientist.

This chapter took a different view, arguing that a detailed examination of the critiques published in newspapers and journals like *The Times* and the *British Critic* reveals the extent to which traditional perceptions of the man of science as a reclusive scholar persisted in the popular imagination. It was suggested that many accusations of effeminacy made against the BAAS stemmed from the continuing gap in the public mind between the idea of the scholar and the gentleman. Members of the British Association were seen by their critics as dishonestly aping the habits of the aristocracy, adopting a foppish and extravagant lifestyle considered incompatible with the cloistered life of the scholar. We considered similar gendered attacks, including accusations of effeminacy, levelled at Humphry Davy during his career, arguing that criticisms of Davy's dress, manners, lecturing style and 'unnatural' relationship with his wife, presaged important features of the later attacks made against the BAAS. Disparaging remarks directed at both Davy and the British Association involving the participation of women in science, particularly the promotion of mixed-sex sociability reminiscent of Enlightenment scientific culture, were pointed to as marking a significant shift in moral attitudes towards the man of science in the late 1830s and early 1840s.

In contrast, Chapter 5 explored the development of a very different ideal of the male scientist in the writings of the British Association's critics. John Bowden, writing in the *British Critic* praised the humble, moral manliness of the cloistered scholar, rejecting the extrovert masculinity of the gentleman as specious and arrogant. It was noted that Bowden's reimagining of the scholar shared important similarities with Thomas Carlyle's portrait of the hero as man of letters, presented as part of his 1840 lectures *On Heroes*; however, on closer inspection, Carlyle was seen ultimately to reject the scholar as masculine hero, viewing him rather as an effeminate and reclusive figure, symptomatic of a speculative and self-conscious modernity. The man of science, by contrast, emerged as a more positive figure for Carlyle, holding out the possibility of reuniting speculation with purposeful action in the world.

The chapter went on to trace the impact of Carlyle's ideal of the active, hard-working and morally earnest man of science upon the rising generation of scientific men, including the future members of the X-Club. It explored the emergence of an internal critique of the Association's aristocratic vision of science and model of sociability, centred on the establishment of the Red Lions dining club at the Birmingham meeting in 1839. Young men of science, including future X-Club members, T.H. Huxley,

John Tyndall and Joseph Hooker, propounded an alternative ideal of the gentleman-scientist, based on the moral qualities of dedication, sincerity and self-discipline. This development reflected a broader cultural shift in understandings of the gentleman, from an ascribed class status to a type of character achieved through hard work and dedication to the pursuit of truth.

Despite the achievements of the X-Club in the 1860s and 1870s, Chapter 6 showed that the 1880s and 1890s witnessed a period of renewed crisis for the BAAS, marked by low public confidence and growing claims that the Association was in decline. Above all, it sustained attacks from anti-vivisectionists, led by Frances Power Cobbe, who accused its members, in particular the physiologists, of abandoning the ideal of the English gentleman for a foreign (German) model of scientific manhood which failed to show sympathy with the suffering of innocent animals. In an attempt to improve its public image, the BAAS began an initiative which saw it hold annual meetings every few years in different parts of the British Empire. In this way, it could associate itself with the masculine language of the 'new' imperialism.

As the 1880s progressed, however, a new threat appeared, in the form of Huxley's 'rich engineer'. For the BAAS, this spectre was realized, above all, in the figure of Guglielmo Marconi, the pioneer of wireless telegraphy, who first attended its meetings in 1896. Marconi's status as scientific entrepreneur, with his private patents and self-aggrandizing rhetoric, presented a powerful challenge to the dominant ideal of the man of science within the BAAS, characterized by personal humility and dedication to collective endeavour. Despite the Association's original interest in the application of science, in the years of X-Club dominance, the idea of science as a means of shaping character (as part of a liberal education) came to predominate over its perceived value as a practical training. In the years before Marconi's rise to prominence, a growing breach developed within the BAAS between those engaged in 'pure' research and those applying the results of research to practical problems. At the 1899 meeting at Dover, Marconi successfully exploited these divisions, claiming full responsibility for the invention of wireless telegraphy. Transmitting messages using the new technology across a national border for the first time, Marconi placed the BAAS firmly in the position of audience. In so doing, he revealed the profound shift which had taken place in the public image and perceived utility of the British Association and their man of science.

As the new century dawned, the BAAS found itself increasingly isolated from the most exciting area of contemporary scientific research—electrical engineering. As Chapter 7 showed, attacks by anti-vivisectionists persisted and the gap between 'pure' and 'applied' science continued to grow. Not since the early days of the Association had the link between the scientist and the reclusive scholar been more powerful in the popular imagination. The public image of the BAAS also suffered in the years immediately preceding the First World War because of its continued commitment to scientific internationalism. Against a background of growing Anglo-German antagonism, the cosmopolitan attitudes of Association members were increasingly viewed with suspicion.

Nor did this impression recede when war actually broke out. When the BAAS heard the news, they were travelling with German colleagues to the annual meeting in Australia. Their solidarity with German scientists and election of a German-born president for 1915–16 was widely condemned in the British press, with the manliness and patriotism of Association members openly questioned. Others within the BAAS, however, viewed the war as an opportunity to prove the scientist's value to the country at a time of national crisis. Following the promptings of engineer, Henry Selby Hele-Shaw, the BAAS asked all sections to detail how their particular science might contribute to the practical problems facing the country. They responded with important proposals for more effectively harnessing the resources of the empire for war. Likewise, the Association's recently founded Section L, working closely with E. Ray Lankester's 'Neglect of Science' committee, set out ways in which science education might be utilized, both to train a new generation of scientists and instil the masculine virtues needed for war. Here, we saw a determined effort to reunite theory and practice. When we compared the situation after the war, the Association gained substantially in terms of its raised public profile and increased recognition from government. Most significantly, though, it succeeded in carving out a new (and enduring) role for the male scientist in peacetime. With his hard work, self-sacrifice and devotion to public service, the man of science became publicly accepted as a model for the manly citizen of the future.

The position of the male scientist, then, at the end of the period covered by this book was ultimately a positive one. He was widely acknowledged as a national hero, capable of playing a vital role in both war and peace. This should not, however, lead us to forget the enormous struggle which preceded these developments. The story of the man of science is frequently

read back to front, with scholars tending to assume that his status as a figure of masculine authority and power was always secure. Hopefully, this book has succeeded in demonstrating that this was not the case. Indeed, the public acknowledgement and support for the man of science following victory in the First World War was, historically speaking, the exception rather than the rule. As we have seen, from the Scientific Revolution in the seventeenth century until the second decade of the twentieth century, the male scientist endured a precarious, sometimes perilous, reputation as a masculine role model. It is somewhat ironic that his long-standing association in the public mind with the effeminate figure of the scholar was only finally undone when he proved his mettle in that most traditional of masculine trials—war.

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