Introduction

In 1894, Thomas Huxley wrote to the editor of *Science-Gossip* magazine, criticizing the appearance in its pages of a vulgar Americanism – the word "scientist."[1] For Huxley, the term denoted the sort of technical practitioner who was valued in a nation ruled solely by concerns for utility. Such a nation, he suggested, was so culturally impoverished that it fabricated words like "electrocution" (coined from "electricity" and "execution"), thereby associating science with an instrument of death, simply for linguistic economy. "Scientist," he implied, was undignified for a person of his caliber, and improper for the community of which he was a member – men of broad learning and moral gravity, capable of pronouncing on matters of general interest. From the mid-1840s, the expression that he and other professional practitioners had used for self-designation was "man of science." It was a title that, in common with those denoting other cultural leaders of the period, such as men of letters or clergymen, was free from the connotations of intellectual or commercial narrowness that could prevent men in Victorian England from entering elite circles of learning. As a community, Victorian men of science may have differed from the "natural philosophers" of the eighteenth and early nineteenth centuries in their sharper sense of distinction from other forms of learned activity (such as literature) and in

[1] *Science-Gossip* 1 (1894): 243. Other objections to the term were raised by John Lubbock, Alfred Russel Wallace, Lord Rayleigh, and the duke of Argyll. The term was in fact of English origin. For a discussion of nineteenth-century usages of "science" and "scientist," see Ross 1962.

their antipathy toward patronage. But there were also important continuities with this older persona, namely a dedication to liberal education, to moral and religious foundations, and to a broad public mission.[2]

A leading expert in marine zoology in the 1850s, Huxley became a notorious figure in the debates over evolutionary theory that arose after the publication in 1859 of Charles Darwin's *Origin of Species*. In the course of his teaching at the School of Mines in London and his ardent defenses of Darwin, Huxley took up paleontology, primate anatomy, and physical anthropology; wrote the controversial book *Man's Place in Nature;* and engaged in a series of disputes with the comparative zoologist Richard Owen, one of the most eminent scientific critics of Darwin's theory of natural selection. Huxley was also extremely active in educational reform, helping to install the laboratory as essential for science teaching and lobbying successfully for the incorporation of scientific subjects into English schools and universities. Through his writings on religion, politics, and culture, he tried to extend the role of the sciences in other spheres as well, and by the end of his career Huxley had become an acknowledged public authority on matters as various as natural rights, the history of Christianity, and the relations of capital and labor.

In each of these areas, Huxley placed himself at the forefront of debates in which the meaning of science was shaped before various audiences. Moreover, the extreme difficulty he had in establishing his career, the extensive controversies in which he engaged, and the ambitious philosophic role that he adopted made explicit many of the assumptions and concerns of scientific practitioners in the period. As he came to occupy important positions within both the scientific community and the government, he was able to exercise considerable influence on the vocational goals and choices of others. Popular and widely acknowledged not only as a leader of the scientific community but also as a man of letters and an educator, Huxley came to embody the ideal of the "man of science" for a wide range of publics. Utilizing the extensive record that he left of his experiences as a science practitioner, popularizer, and debater, and of his reflections on his vocation and its social significance, this book examines the creation of the Victorian "man of science" – a persona about which surprisingly little is known. Rather than a straightforward recounting of Huxley's career, this book explores his wide-ranging activities in shaping the scientific practitioner as a historical subject. By focusing on the making of scientific identity, a number of the prevailing

[2] On the gentlemanly codes and broad civic concerns of scientific practitioners in the first half-century, see Kargon 1977, Berman 1978, Cannon 1978, Morrell and Thackray 1981, and Alborn 1996.

interpretations of Huxley's life may be incorporated, even while some of their underlying assumptions are recast.[3]

Huxley is among those figures most widely referred to in histories of Victorian science and, indeed, in more general studies of Victorian culture.[4] Assessments of his work have been quite varied. He has been hailed as a leading promoter of meritocracy, a tireless opponent of clerical and aristocratic forms of authority, and a progressive representative of workers and women.[5] He has also been portrayed as the architect of a new elitism of experts, the high priest of a religion of science, and an ideologue of middle-class patriarchy and European racial superiority.[6] From the 1970s, scholars have interpreted Huxley's wide-ranging career most often through the category of professionalization. Their accounts have situated Huxley among the leaders of a rising scientific community struggling against an older, priestly caste for cultural hegemony.[7] Thus, for example, the activities of Huxley's "X Club" – a small group of practitioners that began to meet regularly in London in the 1860s – have been viewed as a strategic campaign to wrest control of the scientific world from clerical and theological dominion.[8] This professionalization model has been taken up anew, although in considerably modified form, in a recent book by Adrian Desmond. The first large-scale biography of Huxley since the respectful *Life and Letters* written by Huxley's son Leonard in 1900, Desmond's lively work locates the professional struggles of scientific practitioners within a broader framework of conflict between the rising industrial Nonconformist classes and the Anglican gentry and aristocracy.[9]

Together with Desmond's biography and much recent work on Huxley, this book rests upon a large body of literature in the social

[3] Compare, for example, the account of courtly life as "self-fashioning" in Greenblatt 1980, and the model of the scientific self as composed of different "cultural resources" in Shapin 1991. For a more extended discussion of the approach taken in this book, see the Conclusion.

[4] Among histories of Victorian science in which Huxley figures prominently, see, for example, Allen 1978, Knight 1996, and Lightman ed. 1997; among intellectual and cultural histories, see Houghton 1957, Brantlinger ed. 1989, and Hoppen 1998. For an overview of the specialist literature on Huxley, see White 2000.

[5] Huxley's anticlericalism has been emphasized, for example, by L. Huxley ed. 1900, and Irvine 1959, and his social progressivism by Bibby 1959, Paradis 1978, and Jensen 1991.

[6] On the religion of science, see Lightman 1987; on Huxley as a defender of Victorian patriarchy, see E. Richards 1983 and 1997; on Huxley's racial theory, see Di Gregorio 1984, and Brantlinger 1997.

[7] See especially the articles collected in Turner 1993.

[8] On the "X Club," see R. MacLeod 1970b, and Barton 1990 and 1998.

[9] See especially Desmond 1998: 615–43, for an overview of the author's approach. See also Desmond 2001.

history of Victorian science. Based on studies of the membership of learned societies, publication in specialist journals, paid positions in teaching and research, and correspondence networks, previous studies have provided a fair picture of a coherent scientific community that began to form in the middle decades of the nineteenth century.[10] This book is also particularly indebted to more general studies of the Victorian period, which have sought to locate the emerging scientific community in a larger constellation of learned groups and intellectual disciplines.[11] Much of this literature has assumed, however, that the identity being shaped through professionalization was that of the "scientist," that is, a highly trained expert who derived an income from research. Such studies have often argued for the increasing autonomy of scientific practice in the Victorian period, alongside the steady advance of scientific authority within other social and cultural domains.[12] Huxley frequently features in these interpretations as the epitome of the rising, professional scientist. Yet, according to his own account, he was neither a scientist nor a professional in the modern sense; nor was the salaried expert the preeminent authority figure in the period, even on matters scientific.[13]

When viewed as a problem of identity formation rather than of professionalization, Huxley's career and the categories that have been used to interpret it appear in a different light. Indeed, the boundaries of scientific identity remained permeable right through the Victorian period – and it is this permeability, rather than professional autonomy, that was crucial to Huxley's authority as a "man of science." If Huxley was successful in advancing the place of science in Victorian society, this was largely a result of his ability to maintain links and forge new alliances with groups other than specialist researchers. These alliances were not merely strategic but were woven into the very fabric of scientific identity. Rather than embrace a narrowly bounded definition of science such as might guarantee exclusiveness and autonomy, Huxley worked hard to bind the meaning of science to values and practices derived from other cultural domains. For example, he made science reliant on moral codes drawn from domesticity and gentlemanliness; he allied science

[10] Among the earlier social studies of the Victorian scientific community, see Mendelsohn 1964, Roderick 1967, Morrell 1971, Cardwell 1972, and Thackray 1974. See also n. 2 above.

[11] Raymond Williams 1958, Burrow 1966, Reader 1966, Cannon 1978, Heyck 1982, R. MacLeod ed. 1988, Perkin 1989.

[12] See, for example, the revealingly titled *All Scientists Now* (Hall 1984).

[13] For arguments against the application of twentieth-century, sociological models of professionalization to the nineteenth century, see Geison 1978, Alter 1987, and Goldstein 1987.

with extant cultural spheres, including literature and religion; and he appealed to models of labor and progress familiar to artisanal and industrial audiences. Such strategies tied science to cultural forms that carried great weight during the Victorian period. This process of definition was mutual; that is, it involved extensive networks and engagements with men of letters, clergymen, workingmen, and -women who, in fashioning themselves, helped to shape the meaning of science. This book is thus organized around the cultural practices and social groups that figured most prominently in Huxley's scientific life. But it also examines the active processes of categorization that went on in defining these practices and groups, both in public debates and in a whole range of private relations and activities. Problems of cultural identity and authority were negotiated not only in print or in grand auditoriums, such as the famous Oxford meeting of the British Association in 1860 where Huxley squared off against the bishop of Oxford, but also in everyday life and in domestic relations, friendships, and correspondence.

The term "scientist" was not of American origin as Huxley had supposed. It had been coined by the Cambridge don William Whewell in the 1830s in order to consolidate what he considered to be an increasingly heterogeneous and fragmented group of investigators of nature and bring them under the moral (and Christian) auspices of the philosopher.[14] That Huxley had ignored the English roots of the term indicates how unpopular the word had proven. Whewell's neologism was not widely adopted in the Victorian period, both because many practitioners had their own highly developed moral sense of vocation, which differed from Whewell's, and because practitioners resented the subordinate and restricted connotations of the term. But by the time Huxley registered his own protest against what he took to be a vulgar Americanism, the word "scientist" was taking hold in Britain. By the end of the century, that distinctly Victorian persona the "man of science" was beginning to vanish, and the "scientist," whose authority derived from laboratory discipline and from juxtaposition to literary culture, detachment from society, and disengagement of "facts" from "values," was already emerging.

[14] Ross 1962: 71–5. On Whewell's concerns to define science in relation to philosophy, see Yeo 1993: 32–8.

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Science at Home

> I have nearly traversed half the globe and have found only error and discord till I came to your cottage, where truth and happiness reside.
>
> – Bernardin de St. Pierre, *The Indian Cottage*[1]

In 1846, Thomas Huxley received an appointment on HMS *Rattlesnake*, a survey vessel bound for the South Seas. In his shipboard diary, the twenty-one-year-old called himself a "man of science," but the designation was highly tenuous. His official title was assistant surgeon, a low-ranking officer in Her Majesty's Navy. With only two years of formal schooling, Huxley had been apprenticed to general medical practitioners in Coventry and London's East End. With the help of a scholarship, he had taken courses at Charing Cross Hospital and had read comparative anatomy and physiology in the library of the Royal College of Surgeons. Having completed the first examination for the degree of Bachelor of Medicine at University College, but lacking the financial means to continue his education, he entered the navy in 1845. A position on a survey voyage afforded a young man an excellent opportunity for furthering a career in science; however, Huxley was not the official naturalist on the *Rattlesnake*. This title fell to the ornithologist John MacGillivray, whose father was a professor of natural history at Aberdeen. Such dredging and dissection as Huxley desired to perform would have to be supplementary to his medical duties. His scientific findings were not guaranteed a place within the official report of the voyage.

[1] Bernardin de St. Pierre 1828: 288.

Huxley's status as a "man of science" thus was uncertain. But both the cultural identity and social role of scientific practitioners were themselves undergoing pronounced transformation at this time. A restructuring within learned societies and educational institutions, and the emergence of an ideology in which gentlemanly character could be acquired, alongside one in which it was innate, had together opened possibilities for young men like Huxley, the youngest son of a failed schoolmaster. Paid positions, however, were still scarce, and precisely what sort of community these men were entering remained unclear.[2] To obtain his naval post and subsequent appointment aboard the *Rattlesnake*, Huxley had to move in circles where patronage operated in tandem with meritocracy, yet where the criteria of merit were not firmly established. Like other aspiring scientific practitioners whom he would later befriend – William Carpenter, John Tyndall, Edward Forbes – Huxley presented himself as hard working, self-reliant, and averse to the entrenched privileges of aristocracy. But like them also, he positioned himself within a high-culture tradition whose bearers possessed inherent and lofty powers that raised them above other commercial and professional men.

In fashioning himself as a man of science, Huxley drew in part on models of genius he had gleaned from romantic literature.[3] He copied long citations from Carlyle's essay "Characteristics" into his diary while still a medical apprentice in 1842, passages that conveyed this romantic persona in some detail. According to Carlyle, genius dwelled in solitary minds whose sparks of thought, once kindled, could inspire action in the multitude. Genius was a heroic intellectual force, which swept the individual along as it carried the age, and yet remained mysterious even to its visionary self.[4] Conceived by eighteenth-century writers as an inborn and effortless capacity, genius lingered on in the Victorian period to describe a variety of self-made man fraught with contradictions: the genius-at-work whose peculiar labor was original rather than mechanical, moral rather than base.[5] Genius was innate, like nobility, yet it often resided in those of humble birth. It consisted partly of

[2] On scientific vocations in the first half of the nineteenth century, see Kargon 1977, Berman 1978, Cannon 1978, Morrell and Thackray 1981, and Inkster and Morrell eds. 1983. On the mid- and late-Victorian period, see Heyck 1982, J. Secord 1985 and 1986b, Schaffer 1988, and Gay 1997. The shifting meanings of "character" in the Victorian period are discussed in Collini 1991.

[3] On romantic models of genius, see Schaffer 1990. Other historical discussions of genius include Battersby 1989, Murray ed. 1989, and Shapin 1990.

[4] Carlyle 1831, quoted in T. H. Huxley Papers, Imperial College of Science, Technology, and Medicine Archives, London (hereafter HP): 31.169, "Thoughts and Doings", journal entry for April 1842.

[5] For eighteenth-century accounts of genius, see, for example, Gerard 1774.

characteristics such as intuition, mental suppleness, and refined discrimination that the Victorians increasingly identified with feminine nature. Yet they also held genius to be firm in its grasp and disciplined – allegedly masculine qualities of mind.[6]

Huxley's character as a man of science thus slipped between Victorian conventions of class and gender. In the early stages of his career, he utilized models of genius in conjuction with Victorian ideals of domesticity. He presented himself as someone injured by the strife and self-interest that governed public life and whose manhood depended on securing a place of work that was removed – like the Victorian sanctuary of "home" – from the sordid intrigue of politics and the grinding routine of professional pursuits.[7] By identifying scientific work with the pure and often feminized domestic sphere, he claimed moral distance from the allegedly corrupt character of other forms of masculine, remunerative work. Huxley's "man of science" was, fundamentally, a gender identity, which entailed particular constructions of the home and of women.[8]

Despite the solitary nature of genius, and Huxley's own tendency to brood while aboard the *Rattlesnake*, his scientific identity was formed not in isolation, but through a process that involved the active contributions of women.[9] Huxley met Henrietta Heathorn, the woman who would eventually be his wife, while he was on shore leave in Sydney in 1847. After four or five meetings over a period of six months, they became engaged. Because of Huxley's difficulties in establishing himself as a man of science after his return to England, the couple could not marry until 1855, an extremely long engagement even by Victorian standards. Over this eight-year period, in which Heathorn resided in Australia and Huxley on board a surveying vessel and then in London, they exchanged several hundred letters and kept journals for each other to read during the long intervals of separation. Their correspondence was perhaps the most important medium through which his identity as a man of science and hers as a wife were shaped. Their protracted separation and arduous social climb forced to the surface many of the assumptions about and contradictions concerning gender during the Victorian period.

[6] The gendering of manners and mental characteristics in the eighteenth and early nineteenth centuries is examined in Outram 1989, Schiebinger 1989, Vincent-Buffault 1991, and Barker-Benfield 1992.

[7] On the Victorian ideology of "separate spheres" of work and home, see, for example, Houghton 1957 and Davidoff and Hall 1987. See also, however, Vickery 1993 and Wahrman 1993, for critical accounts of historians who have taken this ideology as descriptive, rather than prescriptive, of gender relations in the period.

[8] On Victorian masculinity, see especially Hilton 1989, Clarke 1991, and Tosh 1991.

[9] Works on gender and the sciences important in framing this account include Outram 1987, Jordanova 1989a and 1993, Daston 1992, and Goldstein 1994.

Imperial and Sentimental

Identity troubles appear early in Huxley's journals and correspondence written aboard the *Rattlesnake*. As surgeon-naturalist on a survey expedition venturing into uncharted waters and visiting unseen isles, Huxley could explore the dark interiors of little-known forms of marine life and make their contents his own.[10] Even before the ship's captain, Owen Stanley, began sounding the Torres Straits and naming islands and mountain peaks for himself, Huxley was working to affix his own name to the field of marine invertebrates, reclassifying Cuvier's Radiata and installing a new order of his own designation.[11] At sea, he had hoped to find an intimate, loyal community of scientifically minded fellows, an auspicious blend of culture and empire in which commerce and militarism were civil.[12] Just a few months after departing England, however, he described how his shipmates made fun of his books and threw his laborious dissections overboard as waste, while the captain remained aloof, apparently disrespectful of learning. Withdrawing from this rough fraternity, Huxley pined for the "social ease" and "friendly influences of a home circle." Above all, he longed for the fellowship of his sister Lizzie, her cultivated mind and taste, her "tenderest heart," and her "more than man's firmness and courage."[13] With both this sister, now emigrated to the United States, and Edward Forbes, a well-placed London naturalist who would become his chief patron, he located the trust and sympathy he missed on board the *Rattlesnake*. With them, he began to share his community of flora and fauna and his arduous search for zoological symmetries.[14]

When he was not dredging and dissecting, or reconstituting a domestic sphere through correspondence, Huxley had the company of novels. Many of these were of the sentimental genre and explicitly linked the occupations he plied in isolation on shipboard: the study of nature and the pursuit of hearth and home. Among the books that his coarse companions mocked were romantic tales about cultured men of feeling whose mission was to domesticate the world with truth. In Goethe's *Werther* and Carlyle's lives of Heine and Jean Paul, men of genius performed

[10] On the extensive utilization of imperial motifs by British naturalists during the period, see J. Secord 1982, Browne 1992, and Drayton 2000.

[11] Huxley's early research program, which was guided by a classification scheme known in contemporary zoological circles as Quinarianism, and his relationship with the chief author of that scheme, William Macleay, are carefully examined in Winsor 1976: 81–97.

[12] See especially his letter to his sister Lizzie, 6 October 1846, in L. Huxley ed. 1900, 1: 26–7.

[13] Diary entries for 10 January and 25 December 1847, in J. Huxley ed. 1936: 15, 71.

[14] On patronage relations as forms of domesticity, see especially Outram 1987.

through learning what women could achieve through feeling: the refinement of rough and rude nature and the softening of harsh men whose public lives were devoted to struggle.[15]

In a letter to his mother from Mauritius, the setting of Bernardin de St. Pierre's Rousseauist fable *Paul et Virginie*, Huxley expressed both attraction and antipathy toward the ideals of sentimental fiction. "In truth," he wrote, "it is a complete paradise, and if I had nothing better to do, I should pick up some pretty French Eve (and there are plenty) and turn Adam." Instead, he visited the tombs of two storybook lovers, whose tale he believed to be "a fiction founded on fact": "Paul and Virginia were at one time flesh and blood, and . . . their veritable dust was buried at Pamplemousses in a spot . . . visited as classic ground." The resting place was a garden wilderness; the lovers' ashes lay in two funeral urns, each raised on a pedestal. Huxley made a sketch of the scene and, returning with a pair of roses to scent his desk, was prompted to remark, "I never was greatly given to the tender and sentimental, and have not had any tendencies that way greatly increased by the elegancies and courtesies of a midshipman's berth."[16]

Though Huxley was more at home with nature and novels than with other agents of empire at sea, he could not be a sentimental culture hero without a host of guilty associations. His berth filled with books, testimonies of domestic affection, and exhibitions (fragrant and foul) of natural beauty, he had to insist to his mother and to himself that his sentimentalism had been extinguished by intercourse with a world ruled by self-seeking and discord.[17] Epitomizing the middle-class Victorian morality Huxley was espousing, Samuel Smiles would characterize the home as a place of enlightenment and civility, "suitable for the growth of the manliest natures," while criticizing writers like Rousseau and Bernardin de St. Pierre as effete.[18] By mid-century in England, the pure and regenerative ethos of the home had been reconstructed by several generations of writers with the expressed object of bounding women's domain. Men's work too was refashioned as a wilderness of strenuous trial, the necessary complement to and practical support for domestic bliss. Within this secular theology of separate spheres, the activities of cultured men might be denigrated as ornamental, leisurely, or effeminate precisely because these men performed the social role consigned

[15] Diary entry for 24 December 1847, in J. Huxley ed. 1936: 70.
[16] L. Huxley ed. 1900, 1: 34. See also J. Huxley ed. 1936: 28–30. For a discussion of *Paul and Virginia* in relation to enduring associations of women with nature and men with culture, see Jordanova 1989a: 33–34.
[17] On shifting attitudes toward sentiments and sentimentality, see Outram 1989, Vincent-Buffault 1991, and Barker-Benfield 1992.
[18] Smiles 1871: 44–57.