

Introduction

The Commerce of Literature and Natural History

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Objects and Disciplines

When Wordsworth's *The River Duddon* appeared in 1820, eleven years before Charles Darwin embarked aboard the *Beagle*, the publishers saw an opportunity for direct marketing to readers interested in natural history: the endpapers of Wordsworth's volume of nature poetry advertise "New Works on Botany, Gardening, Agriculture, Geology, Mineralogy, Philosophy, &c. published by Longman," including general works of natural history, theoretical treatises, gardeners' manuals, and even mock-heroic poems on geology such as "King Coal's Levee; or Geological Etiquette."¹ Such vivid illustrations of "the availability of scientific culture" in the Romantic period are still surprising—they suggest that much of what we now call "science" was embedded in a cultural network more established and more vast than what has emerged in the revealing literary scholarship on Darwin.² Longman's advertisement documents the most literal form of commerce joining literature and natural history in Wordsworth's time: the publishing industry. The rapid expansion of print culture beginning in the later eighteenth century fueled the circulation of writings famously obsessed with nature, from Romantic poems and scenic tours to theories of the picturesque or the Deluge to the persistent and polymathic genres of natural history. These kinds of writing shared a common readership, and major publishers such as Longman (and authors such as Wordsworth) promoted their long-standing affiliation. At the same time, the increasingly self-conscious establishment of many of these discourses as disciplines—including geology, meteorology, aesthetics—led to new efforts both to join and to distinguish different kinds of objects and modes of cultural production.

This book addresses the mutually constitutive nature of literary and scientific discourses in Britain during the later eighteenth and early nineteenth centuries, the period of what is sometimes called the “second scientific revolution.”³ The contributors analyze the signs of this commerce of literature and natural history, which also operate as currency in more symbolic forms of commerce: applied science, global and imperial exchange, cross-disciplinary appropriations, and other forms of cultural production and reproduction. These signs include a decaying, badly taxidermied moose sent by Thomas Jefferson to the Comte de Buffon in Paris to prove the vitality of American species; a collection of fossils sold to the British Museum and inspiring visions of the earth as a vast fund of knowledge and resources; a shattered oak tree that taints an Edenic vision of British climate and history by registering a violent tempest and a symbolic threat to British naval superiority; and a vegetable—the cucumber—whose sexual potential is neglected by poets only to be exploited by the authors of kitchen garden manuals. These objects evoke the larger economy of ideas and resources both reflected and regulated by the print culture encompassing literature and natural history in late-eighteenth- and early-nineteenth-century Britain.

The economy governing the commerce of literature and natural history is not just the subject matter of this book, but continues to operate in the institutional culture producing the scholarship collected here. The chapters that follow resist constraints of specialization that were just beginning to form in the early industrial era. Though the “economy of nature” pursued by that era’s intellectuals seems quite remote from the objects of current scholarship, both phases are chapters in the same story: the story of the modern disciplines. Timothy Lenoir has recently pointed out economic continuities within this story, arguing that “disciplines are political structures that mediate crucially between the political economy and the production of knowledge.”⁴ Antiquated though it may appear at first glance, the satire in our frontispiece targets both of these modern and postmodern issues: the conflict between disciplines and the connection between knowledge and the market. This image first appeared in 1788 as the frontispiece to a satirical poem by “Peter Pindar” (John Wolcot) addressed to Sir Joseph Banks, the period’s most eminent naturalist, who is seen in the cartoon devouring a snake. The verses are “a lengthy attack on Banks for . . . ejecting [natural] philosophy . . . from the [Royal] Society in the petty interests of natural history.”⁵ Most obviously, the cartoon ridicules the activities associated with natural history and Banks in particular: the collection and classifying of numerous exotic specimens. The verses spell out the implication that natural philosophy—the competing natural science discipline in the late eighteenth century—is the more serious discipline and ought to remain at the center of official scientific activity. In his first decade as president of the Royal Society, Banks had successfully asserted the priority of natural history. His other major office was that of *de facto* scientific director of Kew, the royal botan-

ical garden, to which he referred in 1787 as “a great botanical exchange house for the empire.”⁶ This commercialization of botany provides the economic basis for the cartoonist’s satire: the problem with natural history (of which botany was one branch) is that it is tainted by ulterior motives. This remains a central objection of many critics of modern science.

Our frontispiece puts into play the literal economics of natural history and its literary context, making it an apt emblem for our investigations of the material culture surrounding natural history in the period. The conflict between disciplines at issue in the 1788 cartoon—and, in its present-day form, underlying the chapters that follow—highlights the importance of the literary context for natural history’s political and economic ramifications. The cartoon and the poem it accompanies criticize Banks’s commercialization of science partly because it disrupts an established model of science as a literary and philosophical pursuit, enshrined in the title of the Royal Society’s profoundly influential journal *Philosophical Transactions*. The evolution of natural history as a commercial sphere is a prominent theme in this volume (see especially chapters 2, 4, 5, and 7). The cartoon also links the proliferation of individual specimens with individual enterprise, a conjunction important to this volume in several ways. On the one hand, Romanticism is traditionally understood as being concerned with the particularity of nature and with individual identity, and it is increasingly understood as being enmeshed with intellectual professionalization. The natural history satirized in Pindar’s frontispiece is “Romantic science” in all these senses. The cartoon is skeptical about specialization, as Romanticism is often held to be. Yet Wordsworth’s poetry (see chapter 1), like Banks’s natural history and the many contemporaneous forms of natural knowledge investigated in this volume, is inextricably a part of the long episodic process of specialization leading to the formation of modern disciplines.

Though “natural history” now has several new and different meanings, it remains a familiar category. “Natural philosophy,” despite the misgivings of Peter Pindar and the cartoonist, was finally eclipsed by the end of the nineteenth century. Both have been superseded by a structure of modern, specialized disciplines, but “natural history,” however modified, persists as a broad rubric for the knowledge and practice of amateur naturalists and for the miscellaneous specimens collected in museums. The conflict between natural history and natural philosophy is still with us in the view that natural history is not proper science in terms of institutional prestige and explanatory power. The cartoon is prophetic in this sense: although Banks contributed to a slow, far-reaching process of specialization that gradually produced various earth, plant, and animal sciences in place of the three traditional “branches” of natural history, the name “natural history” stuck to a set of ostensibly unrigorous cultural practices. This volume considers natural history as a literary practice during a transitional phase, along with numerous other social and material practices for the transmission of natural knowledge. Many of these

evolved into newly specialized scientific practices, though natural history also retained some of its key features, including its generic identity as literature. The length of this transition has produced a number of contradictory explanations in the history of science and culture. This is why “natural history . . . seems to have come to an end so often,” as James Secord puts it.⁷

The image of Banks’s dinner for naturalists, like the chapters in this book, pinpoints an important local shift within the long, slow process of intellectual specialization. This process spans more than three hundred years, from the initial conflict between natural history and natural philosophy to the present-day proliferation both of ever-more specialized disciplines such as “nanoscience” (now a separate Ph.D. field at the State University of New York–Albany, with other programs pending) and of interdisciplinary initiatives such as the present volume. The crucial distinction between natural history and natural philosophy in the Romantic period was that the former called for fieldwork, the component that kept natural knowledge accessible to a generalist public, both in the field and on the printed page. This distinction was crucial partly because it permitted the synthesis between theory and fieldwork that produced many of the modern disciplines. Historians of geology, for example, use the foundation of the Geological Society in 1807 as their touchstone for discipline formation; much of natural philosophy, by contrast, had been codified by Newton, and even chemistry, though still solidifying in the era of Humphry Davy, was already characterized by a sharper cleavage between practitioners and the public.⁸ Both the empirical and the literary components of natural history can be traced to Pliny and the Renaissance revival of natural history. But as natural history was revived, the Copernican and associated “revolutions,” culminating in Newtonianism, created a competing disciplinary structure out of natural philosophy by grounding it in “mathematical principles” and formulating a distinct formal language for physical and astronomical knowledge. The process of discipline formation, then, can be traced at least as far as the publication of the *Principia* in 1686. *The Origin of Species* (1859), however, is just as commonly taken as a landmark of discipline formation and the divergence of literature and science. This amorphous chronology leads to the massive contradictions alluded to by Secord. Mark Greenberg, focusing on Newtonianism, argues that poets were at work as early as the 1720s “appropriating” the power and prestige of a science they already recognized as the stronger of “the two emerging institutions.”⁹ Gillian Beer, on the other hand, just as confidently refers to Darwin’s idiom as “literary . . . discourse,” explaining that in Darwin’s time “scientists themselves in their texts drew openly upon literary, historical and philosophical material as part of their argument.”¹⁰

Romantic Science proceeds from two contradictory premises: self-consciously interdisciplinary method and historically specific scholarly practice. It aims to historicize the disciplinary boundaries between literature and science not only in

the content but in the form of the chapters, each of which reimagines and redraws those boundaries in relation to their current forms. Alongside this intellectual revisionism, the collection's distinctive focus on the Romantic period allows for concrete and specific examinations of the origins of our own intellectual landscape. Contradictions inevitably attend this intervention in the historical and methodological space between the above accounts of Newtonianism and "Darwin's Plots." Sensitivity to the historical uniqueness of Romantic natural history (à la Beer) is conditioned by the inexorable triumph of Newtonianism (à la Greenberg). While natural philosophy, as we have seen, gradually lost its currency, its main areas continue to stand atop the hierarchy of disciplines. As Secord puts it in *Cultures of Natural History*, "histories of the life and earth sciences continue to be dominated by fields . . . that claim a theoretical generality akin to that of physics" (458). Margery Arent Safir brings out the implicit connection between this domination and the "weaker" institutional position of literature: "are authors of fiction seeking to share in the power and authority contemporary society accords science?"¹¹ The context for her question is a post-disciplinary climate that she sees as a potential site for the return of an educated public pursuing encyclopedic knowledge "in the fashion of Buffon" (11). In keeping with Safir's call for a "more comprehensive and more inclusive interdisciplinary practice" among academics (18), this volume combines and considers many different disciplines, providing points of access for many different readers.

A post-disciplinary climate, however, cannot be created without a careful examination of cultural history. Most of the contributors to this volume are professional scholars of British Romanticism, one of several disciplines currently engaged in reevaluating and (as it were) historicizing historicism. The volume itself is published by a university press series devoted to the "Long Nineteenth Century." The title invokes recent efforts to reconsider the use of centuries as the main organizing principle of scholarship in the humanities, a legacy of the professionalization of that scholarship in the nineteenth century. One such effort is documented in the *PMLA* forum "Who's Carving Up the Nineteenth Century?" (October 2001), which features Romanticists reflecting on the anxieties associated with this period that is not a century, wedged between the ever longer eighteenth century and the Victorian period. One of these essays offers an anonymous epigraph that raises compelling questions about the carving up of centuries in the humanities: "If you don't say to them that . . . the legacy of 19th century historicism was 20th century academic territoriality, that the artifice of centuries is only useful as a foil against which to pose searching queries about poetry, cultural expression, textual practice etc. . . . then who will?"¹² In response to such questions, this volume offers a purposive historicism, a focused cultural history that acknowledges its heuristic relation to larger questions concerning the compartmentalization of culture. Each of the essays will suggest differences between a pre-disciplinary and a post-disciplinary climate, which

cannot be imagined as a return to the culture of natural history. Nor will such a climate be produced by a return to unified standards of causal explanation—as Safir also advocates—according to which a scientific theory is relevant to a work only when its author is known to have studied the theory; nor by a return to tried and true definitions of Romanticism as a small body of poetry produced by a handful of geniuses. All these are disciplinary constructions, merely reflecting the extent to which culture has been disciplined.¹³

Romantic Natural History

One of the virtues of natural history, then as now, is that it helps to unite local scholarly efforts in literature and science. The scientific backgrounds of specific texts are important in themselves and as distinct moments of scientific culture, but they are also jointly important as evidence of the shared culture of “letters” and of the epistemological claims of literary projects to explain the natural world. Such claims reflect the historical importance of aesthetic forms for the transmission of scientific concepts—the transmission that ultimately makes possible the division of the scientific disciplines from literary culture. These historical circumstances inform two of the distinctive contributions of *Romantic Science*: its precise historical focus on the Romantic period and the resulting effort to redeploy categories of literary history, such as “Romanticism,” within the broad new context of cultural history emerging from the work of literary scholars and historians of science. Most broadly, the chapters of this book are united by their shared focus on English literature and natural history between Linnaeus and Darwin and the common issues that arise from the particular convergences of literary and scientific culture during that period.¹⁴ The term “natural history” itself, as it was used in the period, designates a subset of the practices that make up this scientific culture, creating a focus distinct from that of synoptic collections on literature and science as well as other scholarship on Romanticism and “the sciences.” Although most of our contributors work primarily on English literature, the collection also reflects the increasingly global reach of the period’s natural history.

Natural history, as a literary practice, shares the style and resources of other literary forms, while scientific epistemology and the cultural imperative of “improvement” with which it is associated also determine the orientation of fiction and poetry in the period. The increasing and simultaneous popularity of natural history, poetry, and the novel in the late eighteenth and early nineteenth centuries created audiences predisposed to synthesize these now divorced forms in their reading and their actual experience of the natural world. The pervasiveness of natural history, though equaled by other nonspecialist discourses, has a special importance because it ultimately precipitated the epochal rupture between “literature” and “science.” By

stressing the literary affiliations of natural history, this collection also contributes to the dialogue between two sometimes competing disciplinary structures of our own intellectual landscape, literary criticism and history of science. While “science studies” can currently be subsumed under cultural studies, this tends to favor the study of twentieth- (and twenty-first-) century culture and has provided a target for polemics against the humanities.¹⁵ Entering the field as a historical form of science studies, this book also reflects on the disciplinary boundaries remaining between literary study and history of science, an epiphenomenon of the more fundamental division between humanities and sciences that necessitates our recovery of the interdisciplinary or pre-disciplinary space of natural history. On the one hand, many of the chapters focus on familiar texts, such as *Frankenstein*, *Prometheus Unbound*, and *Robinson Crusoe*, bringing the cultural context of science to bear on widely recognizable objects of literary study. On the other hand, each of the chapters also draws on and responds to the work of historians of science, contributing to the ongoing effort at cross-fertilization between the two methodologies.

The generic and cultural richness of Romantic natural history holds particular rewards for literary analysis. The genres of natural history explored in *Romantic Science* include numerous verse forms, fictional and nonfictional narratives, journals, letters, public lectures, and kitchen garden manuals, among others. This approach continues a project laid out by the cultural historian Ludmilla Jordanova: “History of science can learn much from the methods of literary criticism, particularly in textual analysis. Treating scientific writings as literary texts involves, for example, asking questions about genre, about the relationship between reader and writer, about the use of linguistic devices such as metaphor, simile, and personification, about what is *not* being said.”¹⁶ Other studies have proven this principle, but it is especially apt here because of the incipient specialization and broad literary purchase of Romantic natural history.¹⁷

There are numerous other reasons for a volume on literature and science to focus on natural history of the Romantic period. Such a project benefits from the fruitful paradox implied by “Romantic science,” a prominent phrase in much recent work by Romanticists—though hitherto unclaimed as a book title.¹⁸ It is a paradox because hostility to science is still a major feature of most popular definitions of Romanticism, which draw on a handful of famous quotations such as Wordsworth’s “we murder to dissect.” As a consequence, the deeply scientific concerns of the period often reveal themselves in surprising and illuminating ways. Jordanova settles on a largely overlapping period, 1760–1820, in *Nature Displayed* (1999) but registers uneasiness with the term “romantic” as a name for this period because it denotes, for her, an artistic “style.”¹⁹ Romanticists themselves, however, have been engaged since the 1980s in articulating a shift from stylistic to historical definitions of this term. Such combinations as “Romantic natural history” are part of the effort to map this terrain historically, an effort overlapping to a large

extent with Jordanova's focus on thinkers who are "products of the Enlightenment," "largely professionals and middle-class," and "worshippers of Nature" (*ND* 6)—a phrase borrowed from Wordsworth's "Tintern Abbey." German Romanticism has been especially fertile ground for work on literature and science because major figures including Goethe, Novalis, and Alexander von Humboldt had scientific training and began their careers as state inspectors of mines.²⁰

The period's publishing industry produced an unprecedented amount of natural knowledge for a general audience, and this abundance in turn provided the point of departure for increased specialization and professionalization. Elinor Shaffer identifies the intellectual engine of this abundance: "the late eighteenth century and early nineteenth century was [*sic*] especially fertile in attempts to synthesize theoretical material drawn from more than one subject, and to find means to come to terms with the increasing domination of scientific modes" (*TTC* 7).²¹ One reason for the period's fecundity is the emphasis on "Nature" investigated by previous generations of Romanticists—as Jordanova points out, "'Nature' included such a multitude of phenomena to be described, marveled at and investigated, that it was inevitable that there should be considerable common ground between the areas we designate as science and literature respectively" (*LN* 23). The growth of literary interest in nature, however, precipitated new divisions of knowledge. The breadth of Romantic natural history was itself conducive to specialization: in the course of our period, its three traditional branches—geology, botany, and zoology—moved rapidly toward the disciplinary status achieved much earlier by the physical sciences, as detailed above. A burgeoning print culture fueled both breadth and specialization. "Far-reaching changes . . . in the publishing business, and also in education and in newspapers," as Jordanova shows, "brought knowledge about science and medicine to a largely non-specialist, though predominantly middle-class, public" (24).²²

From the beginning, specialist discourses have relied on the literary as a category against which the scientific may be set off. As George Levine puts it, "[S]cience established itself professionally in England in part by rejecting literature—at least those excesses of literature that seemed to the Royal Society to corrupt thought."²³ Writing in 1684, Thomas Burnet adopts such a rhetorical stance when he distinguishes the "Oratour's" view of the earth as "a beautiful and regular globe" from the "impartial" prose of the "Philosopher" who recognizes it as "a broken and confus'd heap of bodies."²⁴ John Playfair, however, writing in 1811, rejects Burnet's and other earlier theories of the earth as "a species of mental derangement, in which the patient raved continually of comets, deluges, volcanos and earthquakes; or talked of reclaiming the great wastes of the chaos, and converting them into a terraqueous and habitable globe."²⁵ This rejection is typical—in the Romantic period some naturalists began to conflate earlier natural history with "literature" in Levine's sense. Although Playfair attempted to

distinguish his own self-consciously modern geology from older natural history, Erasmus Darwin had insisted only twenty years before on the importance of obsolete or fanciful theories even in the rigorous precincts of natural philosophy: “[E]xtravagant theories . . . in those parts of philosophy where our knowledge is yet imperfect, are not without their use; as they encourage the execution of laborious experiments, or the investigation of ingenious deductions, to confirm or refute them.”²⁶ Literary qualities—whether embraced for their imaginative “extravagance” or discarded as “raving” excess—were thus essential to specialization and professionalization in numerous areas we now see as strictly scientific. A generally informed readership was not the least of these literary requirements, as the same print market served the professionalization of both literature and science. Theresa Kelley—to cite an example from chapter 8 of this volume—shows that representations of flowers in the writings of Charlotte Smith and John Clare depend on readers’ familiarity with increasingly technical botanical works such as Sowerby and Smith’s *English Botany*.

“Natural history” is a problematic term partly because it persists as a disciplinary category from the seventeenth century up to *The Origin of Species* and beyond. The phase between Linnaeus and Charles Darwin, however, is a very fertile and important period for natural history: as poets and novelists embrace more strongly than ever before the literary tradition it represents, self-consciously modern and increasingly professionalized naturalists repudiate that literary tradition as empirically unsound and seek to appropriate the term for the emerging sphere of modern science. At the same time, especially toward the end of the period, amateur naturalists seek to reclaim the space of natural history in the name of folk traditions, a point raised in two of the chapters on botany. *Romantic Science* includes a whole section on botany partly because it serves as a bellwether for the transitional phase that focuses the volume: the beginning of this period is strongly marked by the movement to adopt Linnaean botany in England, which begins at mid-century and moves through a set of distinctly literary controversies—some already well-known, others newly elaborated in these chapters (7, 8, and 9). The overlapping chronologies of botany and Romanticism provide a unifying framework for the various other subjects explored here, such as mineralogy and biogeography, and the science and literature evolving from them.

By situating this volume on the border between the cultural study of science and literary scholarship, we aim to reach teachers and students of English literature as well as historians of science and other readers interested in cultural history.²⁷ The historically specific combination of intellectual breadth with depth and variety of content—as an unprecedented volume of observations of natural phenomena streamed into imperial Britain, and into print—will be evident in the range of subjects treated in these essays. But the volume’s historical focus also allows them collectively to demonstrate the importance of the period for the formation of

humanistic and scientific disciplines. During the crucial period between Linnaeus and Darwin, the professionalization that would drive the disciplines apart was only just becoming viable, and literary texts provided the cultural currency required for natural history to become an increasingly middle-class avocation.

As a collection of essays by several hands, this volume does not strive for methodological unity. The project as a whole is loosely affiliated with the paradigms of public culture that have been so prominent in the work of scholars studying Romantic literature, Enlightenment science, and the surprisingly extensive area that overlaps these two apparently opposite rubrics.²⁸ Much of this work is still indebted to the public sphere paradigm of Jürgen Habermas, though the concept of public culture encompasses an increasing range of new possibilities, as this volume helps to illustrate.²⁹ Many forms of natural history have particular claims to public sphere functionality because they are not only objects of taste but can also be materially serviceable in social advancement (see, for example, chapters 1, 2, and 7 of this volume). Implicitly complicating Habermas's bifurcation of the bourgeois public sphere—in which “women and dependents are practically and juridically excluded from the political public sphere, even though female readers . . . often participate more fully in the literary public than the property owners themselves”—*Romantic Science* also highlights numerous cases in which the literary practice of natural history facilitates women's *political* participation in cultural life.³⁰

However, this focus on issues susceptible to Habermasian analysis, such as the political ramifications of a certain branch of print culture and the discursive processes of discipline formation, points more to the intellectual currency of these issues than to the specific influence of Habermas. In chapter 8, for instance, Theresa Kelley argues that John Clare and Charlotte Smith manipulate botanical taxonomy to “gain a strong poetic purchase on one of Romanticism's material cultures.” The metaphor of “purchase” nicely brings out one sense of the cultural *commerce* of literature and natural history. Just as Clare and Smith participate intellectually and commercially—here in the sense of competition for overlapping readerships—in the public discourse on taxonomy, Mary Shelley participates in the intellectual milieu surrounding William Lawrence, her personal physician, whose lectures (published as *Lectures on . . . the Natural History of Man*) were attended by Percy Shelley. Her participation in this discourse gains political force, in Anne Mellor's reading (chapter 6), inasmuch as *Frankenstein* scientifically emphasizes racial difference, in dialogue with Lawrence and other race theorists, ultimately for the purpose of promoting racial harmony. Stuart Peterfreund (chapter 3) argues that Gilbert White's *The Natural History of Selborne* (1789) “reveals a symbolic register in terms of which meteorological catastrophes stand for the manifestations of sociopolitical change threatening the established order of England,” and he explains how this political dimension is tied both to the volume's initial commercial failure and its tremendous eventual success in the 1820s. Alan Bewell (chapter 4) offers a case study of bio-

geography—perhaps the most aggressively colonial form of natural history—to illuminate Thomas Jefferson’s advocacy of natural history as a public and political discourse in the early years of the Republic. Catherine Ross (chapter 1) explicitly draws on Habermas, and more particularly on the sociology of the professions, to explain the senses in which Wordsworth and Davy were “rivals in the public sphere.” Lydia Liu’s chapter (5) may be especially relevant here because she bridges the distance between the early eighteenth century and the modern world—one of the gaps in public sphere theory—as she traces the eighteenth- and nineteenth-century reception history of *Robinson Crusoe* (1719) in terms of prolonged scientific and commercial developments anticipated by the novel.

Introducing the Chapters

This book is in three parts: the first three chapters delineate some of the boundaries of natural history; the next group of three addresses the global reach of natural history; and the last three chapters concentrate on the representative story of botany, as I have mentioned. The first part addresses boundaries that are discursive rather than geographic, boundaries negotiated to some degree in all the chapters. The middle part represents another core concern of the book in its focus on the transcontinental movement of natural history—a legacy of the “republic of letters”—and its global claim on climate (see especially chapter 4), resources (chapter 5), and cultures (chapter 6). While these three chapters deal explicitly with the claim of scientific theory on conditions obtaining on opposing parts of the globe, the cross-cultural transmission of natural history is important in the other parts as well. Theresa Kelley and Rachel Crawford (in part 3) address the “vernacularization” of Linnaean and other botanical systems, for example, while my own chapter (in part 1) involves the concept of the global and its geological origins. Geology, like meteorology and chemistry—the other fields addressed in part 1—was at an active stage of discipline formation during the period covered by this book. Shelley and White (chapters 2 and 3) self-consciously blend archaic and modern concepts from natural history, a move characteristic of the transitional phase of discipline formation. Humphry Davy, in dialogue with Wordsworth (chapter 1), assertively claims a place for chemistry outside and morally equal to the literary culture surrounding natural history. Botany—as illustrated by the last part of this book—arguably maintained its proto-disciplinary complexity longer than the other branches of natural history: it was in the vanguard of all modern life science as the original site of Linnaean systematization, beginning midway through the eighteenth century, but as late as 1823 (chapter 8) English botany remained a healthy tangle of competing systems. The resulting debates retained their political currency (chapters 7 and 9) until even later.

Chapter 1 marks the parameters of our main focus on literary natural history by analyzing the “professional rivalry” between Wordsworth and Davy. Catherine Ross demonstrates a rivalry that is surprising to us in the era of “two cultures” because it was based on close affinities in philosophy and rhetorical style, as well as class background. Applying public sphere theory and the sociology of the professions to this relationship, Ross foregrounds the questions of disciplinarity and polymathism that are at issue throughout the volume. Natural history was the territory contested between the rivals, in the sense that Wordsworth and Davy created distinct professional identities by articulating mutually exclusive claims on “Nature,” thus removing it from the shared territory of natural history. Davy instead champions natural philosophy as the forum of scientific modernity, appropriating the standards of accessibility that came from natural history and from Wordsworth, who also tried—with less success—to create a career as a public intellectual using the “real language of men.” In chapter 2, I analyze the paradigms of earth history shared between works of Percy Shelley and William Smith, an economic geologist whose work was so accessible that it was dismissed (as well as plagiarized) by the geological establishment and thus failed to produce professional success. In the context of Smith’s maps and writings (1815–1817), Shelley’s images of rocks as a natural archive in *Prometheus Unbound* (1819) form a crucial chapter in the emergence of the “rock record” as a modern geological paradigm. The culturally pervasive metaphor of the archive is central to both, showing the origins of the “rock record” in applied mineralogy and poetry, two areas of natural history *outside* the disciplinary boundary being erected at the same time by the Geological Society. Turning to the earliest English form of geology and cosmology, chapter 3 examines the discourse of physico-theology and its role in the Romantic natural history of Gilbert White. Stuart Peterfreund argues that White’s *The Natural History of Selborne*, drawing on Milton as well as physico-theology, infuses local natural history with hints of global catastrophe. Focusing on apocalyptic allusions to climate change, Peterfreund shows that White’s Edenic vision unconsciously registers historical conflict through its dependence on John Ray and William Derham—a dependence which, ironically, limited his popularity at a time when this scriptural science was being condemned as old-fashioned.

Chapter 4 also focuses on climate change, but in the modern context of biogeography, which connects local weather to global climate through the discourse of colonialism, rather than biblical typology. If White’s and Wordsworth’s popularity was much delayed for reasons relating to their lack of scientific modernity—as Peterfreund and Ross, respectively, suggest—then the modernity associated with colonial biogeography seems to have contributed to the more immediate popularity of Buffon’s *Natural History* (1749–1804), for Bewell a major source for the politics of climate on both sides of the Atlantic. At a time when, as

Bewell argues, “climate functioned as a primary category of cultural and political analysis,” data on the American climate seemed to justify both republican government and the human capacity to transform physical environments. Bewell’s essay analyzes the late-eighteenth-century debate concerning the quality of the New World as a biological habitat, drawing on Jefferson’s correspondence as well as the poetry of Keats and Blake to establish a connection between republicanism and climate change. Continuing the investigation of the global effects of natural history, chapter 5 examines British and European anxieties over the circulation and reproduction of Asian prestige commodities. Though Lydia Liu’s essay considers our period only briefly in its broad historical contextualization of *Robinson Crusoe*, it is the period in which the scientific and commercial narratives about porcelain, adumbrated in the novel, come together. The nexus of literature and natural history in this context is material culture, specifically the European project of reproducing “true” porcelain, carried on in the sphere of British letters from *Robinson Crusoe* to the *Philosophical Transactions of the Royal Society* to the correspondence of Erasmus Darwin and Josiah Wedgwood. Historicizing the novel’s vaunted realism, Liu points out its repressed traces of “science fiction,” a repression amplified over the centuries in readings of the novel and in geological experiments that repress the cultural context of Chinese porcelain. The element of science fiction allows her to isolate moments in the novel’s reception history—from Rousseau’s reading to Jules Verne’s and beyond—that correspond to scientific and commercial developments the novel merely anticipated.

In Defoe’s and Réaumur’s accounts of trying to replicate (or replace) Chinese porcelain, Liu identifies twin legacies that are important for the commerce of literature and natural history in the Romantic period. The multiple senses of “China” in Liu’s essay come into play in Wedgwood’s commercial project and a section of Darwin’s *The Botanic Garden* (1791) devoted to it, in the experiments of James Hall to prove the theories of James Hutton, and even in the rise of *jardin anglo-chinois* on the Continent, with its allegorized tableaux of science and commerce. Anne Mellor (chapter 6) brings out a more general racial anxiety accompanying Asian–European connections made within and between Romantic literature and science. In “*Frankenstein*, Racial Science, and the ‘Yellow Peril,’” Mellor shows that the racial identity of Frankenstein’s creature is historically conditioned by another body of continental scientific discourse with global claims, physical and medical anthropology. She argues that the creature’s characteristics conform to Asian racial types defined by the natural philosopher J. F. Blumenbach. Blumenbach’s foundational classification of races was expanded in *Lectures . . . on the Natural History of Man* by the Shelleys’ physician William Lawrence, with whom they participated in public and private scientific discussion. The same classification later fueled the racist imagery of a “yellow peril,” which Shelley’s novel, Mellor argues, anticipates and resists.

Romantic Science concludes with three chapters examining the literary applications of botany, while also continuing Peterfreund's and Bewell's concern with the practice of local natural history. Rachel Crawford's contribution presents kitchen garden manuals as one of the largely unexamined aspects of natural history and the most popular "science" of the eighteenth and early nineteenth centuries. Arguing that kitchen gardens combine didactic purpose with lyric strategies well before the lyric turn which we associate with Romanticism, chapter 7 examines four convergences between the space of the kitchen gardens and that of minor lyric forms, vividly illustrating the interchange of literature and natural history. In "Romantic Exemplarity: Botany and 'Material' Culture" (chapter 8), Theresa Kelley compares the ways in which Charlotte Smith and John Clare use botanical figures and botanical practice to present taxonomy as a vehicle and figure for Romantic dissent. For both poets, botany provides a material basis for specifying the topological work of individual difference within a community or public. Also looking at botanical taxonomy, Amy King argues in the final chapter of this book that Elizabeth Gaskell draws attention to her working-class characters' powers of classification in order to suggest a dual program of reform. Natural history appears as both a working-class intellectual program merging tradition and enlightenment and an instrument for correcting the philosophically false classification of human beings as belonging to different "classes."

The historical "bookends" of this collection, Liu's chapter on *Robinson Crusoe* and its reception history and King's on Gaskell's *Mary Barton* (1848), highlight the persistence of taxonomy as a major form of currency in the commerce of literature and natural history. *Robinson Crusoe's* account of earthenware vessels anticipates the increasing importance of such terms as *kaolin* and *petuntse* in the scientific effort to domesticate these substances and apply their mineralogy, emptied of cultural content, to "theories of the earth" in the later eighteenth century. Gaskell, on the other hand, reaches back to the natural history of the eighteenth century and before to support natural history's claim to the status of folk culture. Theresa Kelley, too, takes up the centuries-long contest between proponents of vernacular botanical names and "natural" classification and advocates of binomial nomenclature and other totalizing systems. Charlotte Smith's resistance to such systems, as well as John Clare's (partly inspired by Smith's), has surprising political ramifications, which in turn supports the notion of political efficacy that Gaskell imagines for natural history. The informed reverence for the natural world in Gaskell's novel—even or especially as a nostalgic counterpoint to the grim realities of Manchester—is an obvious legacy of Romanticism. Defoe's erasure of Chinese porcelain taxonomy provides a less traditional, but equally important, connection with Romanticism by introducing the global and colonial dimensions essential to this volume's elaboration of "Romantic natural history" as a cultural category. The cultural and gender politics arising from issues of taxonomy return us to one

of the central concerns of this book: the public sphere functionality of Romantic natural history, especially in relation to women.

The taxonomic argument in Rachel Crawford's chapter (7) is literary rather than natural, extending the definition of what constitutes a literary text. Rather than viewing literature through the discourse of natural history, as is traditional, her approach examines an overlooked aspect of natural history through the lens of poetics. This apparent inversion of relationships highlights a central method of this collection: making the forms of natural history the object of literary analysis. In Crawford's essay, for example, the ideology of social and sexual productivity finds a forum both in the lyric and the kitchen garden manual, while in Liu's essay the "poetics of colonial disavowal" equally informs readerly responses to a novel and the scientific and commercial quest for "true porcelain." The purpose of this method is not to prove once again that natural history is a cultural artifact, but to show it as a form meaningfully cognate with other literary forms of the period. To this end, *Romantic Science* considers works of natural history side by side with works of "imaginative literature," illuminating the multitude of concrete and specific relationships that exist within and among these works, and establishing an important historical dimension of both literature and natural history as interlocking cultural practices.

Notes

1. John Wyatt's *Wordsworth and the Geologists* (Cambridge: Cambridge UP, 1995), 64, first drew my attention to these advertisements. I have since examined the Huntington Library copy of *The River Duddon, a series of Sonnets: Vaudracour & Julia: and other Poems. To which is annexed, a topographical description of the Country of the Lakes . . .* (London: Longman, Hurst, and Rees, 1820). The two comic poems advertised by Longman are the fourth edition (!) of "King Coal's Levee; or Geological Etiquette, with Explanatory Notes; and the Council of Metals. To which is added, Baron Basalt's Tour" and "A Geological Primer, in Verse; with a Poetical Geognosy," both priced at four shillings.

2. Major studies of this later period include Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction* (London: Routledge, 1983); and George Levine, *Darwin and the Novelists: Patterns of Science in Victorian Fiction* (Cambridge, MA: Harvard UP, 1988). "The availability of scientific culture" is John Wyatt's phrase (64).

3. See, for example, A. Cunningham and N. Jardine, eds., *Romanticism and the Sciences* (Cambridge: Cambridge UP, 1990), xix–xx; and Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (1966; New York: Random House, 1970), xxiii.

4. *Instituting Science: The Cultural Production of Scientific Disciplines* (Stanford: Stanford UP, 1997), 47. Lenoir goes on to argue that "disciplines do not have single originary sources, but are more appropriately grasped as interactive system effects. The idea of an economy best captures this sort of dynamic" (52).

5. M. D. George, *Catalogue of Political and Personal Satires Preserved in the Department of Prints and Drawings in the British Museum*, 9 vols. (London: British Museum, 1949), 6:554–55, item 7431. The Wolcot poem is entitled *Peter's Prophecy . . . or, an important Epistle to Sir Joseph Banks* (London: G. Kearsley, 1788). Wolcot chastises Banks for using science as an instrument of power and for “vaunt[ing] on his great acquaintance with vegetables and monkeys” (“Argument”).

6. Ray Desmond, *Kew: The History of the Royal Botanic Gardens* (London: Harvill, 1995), 126, quoting Banks's letter to H. Dundas of June 15, 1787. Cf. Desmond's remarks on botany and global commerce (91).

7. N. Jardine, J. Secord, and E. C. Spary, eds., *Cultures of Natural History* (Cambridge: Cambridge UP, 1996), 449.

8. On the last point, see Jan Golinski, *Science as Public Culture: Chemistry and Enlightenment in Britain, 1760–1820* (Cambridge: Cambridge UP, 1992). Developments comparable to the foundation of the Geological Society, in the areas of botany and zoology, might include, respectively, the formation of the Linnaean Society in 1788 and the publication in 1812 of Georges Cuvier's *Recherches sur les ossements fossiles de quadrupèdes*. The moment of discipline formation is not as clearly demarcated in zoology and botany, which might be said to coalesce into modern biology after 1828 (from the discovery of the cell) or after Darwin.

9. “Eighteenth-Century Poetry Represents Moments of Scientific Discovery,” *Literature and Science: Theory and Practice*, ed. Stuart Peterfreund (Boston: Northeastern UP, 1990), 115–37, here 120. Cf. Robert Markley, *Fallen Languages: Crises of Representation in Newtonian England, 1660–1740* (Ithaca: Cornell UP, 1993); and Larry Stewart, *The Rise of Public Science: Rhetoric, Technology, and Natural Philosophy in Newtonian Britain, 1660–1750* (Cambridge: Cambridge UP, 1992).

10. *Darwin's Plots* 7.

11. *Melancholies of Knowledge: Literature in the Age of Science* (Albany: State U of New York P, 1999), 18. Cited parenthetically in the text hereafter. The program described in what follows is informed by suggestive readings of both academic and general intellectual culture. The “upscale popularization” of science Safir delineates (7) has also unexpectedly impacted this volume, in the form of a best-selling new biography of William Smith, a geologist who is the subject of chapter 2.

12. Jerome McGann, “Who's Carving Up the Nineteenth Century,” *PMLA* 116.5 (October 2001): 1415–21, here 1415.

13. Or, in Lenoir's somewhat melodramatic formulation: “‘The Discipline’ as such does not exist; it is at best an abstraction formed in the service of a disciplinary program” (*Instituting Science* 71). All three contributors to the *PMLA* forum seem at least somewhat nostalgic for a more limited canon of Romantic texts; Charles Rzepka, for example, believes that only “a handful of authors,” however shifting, will comprise Romanticism's enduring “gold standard” (1429–30). For Safir's advocacy of causal explanation, see *Melancholies* 20.

14. One of our departures from traditional literary history will be obvious from the table of contents, which highlights two novels—*Robinson Crusoe* and *Mary Barton*—that fall outside the Romantic period. This deviation, and the use of Linnaeus and Darwin as

markers for an alternative chronology, are addressed in the section of chapter summaries and the paragraphs immediately preceding it.

15. I certainly do not mean to endorse such polemics, including those in John Brockman's *The Third Culture* (New York: Simon and Schuster, 1995) and the literature attending the "Sokal hoax." However, the cultural study of earlier science is not as susceptible to the same charges of relativism and intellectual fraud simply because the nature of disciplinary boundaries in that period differs so radically from our own. On the other hand, the digital age (as in the work of N. Katherine Hayles) has been a major focus of work on literature and science because it is creating a new transformation of disciplinary boundaries.

16. *Languages of Nature: Critical Essays on Science and Literature* (London: Free Association Books, 1986), 20. Cited parenthetically in the text hereafter as *LN*. Subsequent abbreviations for parenthetical citation are given in square brackets following the title of the work.

17. In a more recent book, Jordanova comments that the period's "richness is only just beginning to be appreciated—it demands a historiography which foregrounds cultural complexities." *Nature Displayed: Gender, Science, and Medicine, 1760–1820* [*ND*] (London: Longman, 1999), 16.

18. The program of the 2000 MLA Convention featured a dozen papers dealing with some aspect of science and Romanticism, including a panel entitled "Romantic Science."

19. *ND* 6. The textuality of science in this period is borne out in a curious way by the fact that important contributions in history of science have been made by trained Romanticists such as Dennis Dean and Morse Peckham. Dean's two substantial contributions to history of geology are *James Hutton and the History of Geology* (Ithaca: Cornell UP, 1992) and *Gideon Mantell and the Discovery of Dinosaurs* (Cambridge: Cambridge UP, 1999). Peckham, who returned to Romanticism as his main scholarly focus, edited *The Origin of Species: A Variorum Text* (Philadelphia: U of Pennsylvania P, 1959), a Herculean labor (considering Darwin's extensive revisions in many successive editions) still of service to students of Darwin.

20. The most recent literature and science collection contains a substantial section on Romanticism, connecting this aspect of German cultural history with the English context. See Elinor S. Shaffer, ed., *The Third Culture: Literature and Science* [*TTC*] (Berlin: de Gruyter, 1998). (This collection devotes equal attention to "Theoretical Approaches" and "Modernism and Post-Modernism.") Two previous collections, *Languages of Nature* and *Nature Transfigured: Science and Literature, 1700–1900*, ed. John Christie and Sally Shuttleworth (Manchester: Manchester UP, 1989), specify the eighteenth and nineteenth centuries as their terrain, though without any particular focus on Romanticism.

21. An impressive body of scholarship bears out these claims about the period. Coleridge emerged as a paradigm case in the early 1980s with Trevor Levere's *Poetry Realized in Nature: Coleridge and the Sciences* (Cambridge: Cambridge UP, 1981), which has been followed by a continuing stream of scholarship, most recently Nicholas Roe, ed., *Coleridge and the Sciences of Life* (Oxford: Oxford UP, 2001). Recent scholarship has also extended the matrix of Romantic science to further poets and a range of historical issues. Examples include Alan Bewell, *Romanticism and Colonial Disease* (Baltimore: Johns Hopkins UP, 1999); Karl Kroeber, *Ecological Literary Criticism* (New York: Columbia UP, 1994); Stuart Peterfreund,

William Blake in a Newtonian World (Norman: U of Oklahoma P, 1998); Alan Richardson, *British Romanticism and the Science of the Mind* (Cambridge: Cambridge UP, 2001); and Wyatt, *Wordsworth and the Geologists*.

22. Cf. Thomas Broman on the interplay between generalist and specialist publications in the 1790s in “The Habermasian Public Sphere and ‘Science in the Enlightenment,’” *History of Science* 36 (1998): 123–49, here 133.

23. *One Culture: Essays in Science and Literature* (Madison: U of Wisconsin P, 1987), 11. Cp. Christie and Shuttleworth, *Nature Transfigured* 2–3; see also p. 9 on specialization.

24. Thomas Burnet, *The Sacred Theory of the Earth* (1691; London: Centaur, 1965), 90–91.

25. This account of the history of geology (published in the *Edinburgh Review*) is quoted in Roy Porter’s *The Making of Geology* (Cambridge: Cambridge UP, 1977), 1.

26. “Advertisement,” *The Botanic Garden* (London: Joseph Johnson, 1791), n.p.

27. The fertile collaboration of historians, literary scholars, and humanist–scientists on other topics in literature and science is well documented in the pages of the journal *Configurations* (1993–), published by the Society for Literature and Science. Eight collections on literature and science have been published since Jordanova’s *Languages of Nature* in 1986, five of them between 1989 and 1991—a crucial period in the evolution of scholarly structures for the study of literature and science. This phase of organization is documented in Peterfreund’s *Literature and Science* (4) and Elinor Shaffer’s introduction to “Literature and Science,” a special issue of *Comparative Criticism* (13 [1991]: xiv–xxix). More recently, somewhat diverging views of the “emergence” of science and literature as a field have appeared in Shaffer (*TTC* 5) and Desiree Hellegers, *Handmaid to Divinity: Natural Philosophy, Poetry, and Gender in Seventeenth-Century England* (Norman: U of Oklahoma P, 2000), 3–4.

28. Much reflection on the “case study”—by Romanticists as well as historians of science—has accompanied the shared trend toward specifying historical moments within public culture. See, for example, James Chandler, *England in 1819: The Politics of Literary Culture and the Case of Romantic Historicism* (Chicago: U of Chicago P, 1998), 6; and William Clark, Jan Golinski, and Simon Schaffer, eds., *The Sciences in Enlightened Europe* (Chicago: U of Chicago P, 1999), 29.

29. Habermas develops his paradigm in *Strukturwandel der Öffentlichkeit* (1962; Frankfurt: Suhrkamp, 1990). It has been much debated whether and how Habermas’s paradigm applies to England after 1750, as he turns from the detailed case study of what might be abbreviated as the “London coffeehouse setting” of 1680–1730 (92, cp. 107) to a broader view of European history. The bourgeois public sphere depends, he says, on the fictive identity of the “human” and economic roles (121), but he traces the connection to various events in English history spanning a period of 150 years, the latter four-fifths of which is not analyzed in cultural terms. Steven Shapin and Simon Schaffer’s contribution in bringing Habermas to bear on the scientific revolution has been highly influential (see *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* [Princeton: Princeton UP, 1985]) and was extended to the period 1760–1820 by Golinski in *Science as Public Culture* (5, cp. 176–87). Other important discussions of science and the public sphere in our period include Thomas Broman, “The Habermasian Public Sphere,” and

Clark, Golinski, and Schaffer in their introduction to *The Sciences in Enlightened Europe* (esp. 25–26; cp. 39 for Dorinda Outram’s more skeptical view).

30. I quote *Strukturwandel* 121 [my translation]. Habermas himself comments, in a lengthy new preface written for the 1990 edition, that his original account does not adequately address exclusions from the public sphere, particularly that of women (18–20). This limitation has provided the opening for a great deal of revision of Habermas’s paradigm. See further *Romanticism and Its Publics: A Forum*, ed. Jon Klancher, *Studies in Romanticism* 33 (Winter 1994); Kevin Gilmartin, *Print Politics: The Press and Radical Opposition in Early Nineteenth-Century England* (Cambridge: Cambridge UP, 1996); and Anne Mellor, *Mothers of the Nation: Women’s Political Writing in England, 1780–1830* (Bloomington: Indiana UP, 2000). The history of geology—to take one example of science in the public sphere—yields examples of women from across the class spectrum gaining access to geological practice, from the Dorset orphan Mary Anning to Georgiana, Duchess of Devonshire, while the broader political purchase of natural history is illustrated by the periodical debate over James Hutton’s *Theory of the Earth* (1788/1795), which became a coded debate about materialism, prompting Erasmus Darwin’s allegorical images of geological “revolution” in *The Economy of Vegetation* (1791).