Introduction

Natural History and the History of Books

On March 19, 1766, the young naturalist Joseph Banks called on Thomas Pennant in St James's Street, London, to present a scarce book by the sixteenth-century ornithologist William Turner.[1] Pennant later considered this volume "as a valuable proof of his esteem," and it initiated a major correspondence and research collaboration.[2] Banks's gift exemplifies the deep involvement of books in the enterprise of natural history. Books formed one side of a tripart relationship with manuscripts and physical specimens, all of which were sorted, described, and annotated to formulate, consolidate, and shape natural knowledge. Books, manuscripts, and specimens variously tied to natural historians' social standing and facilitated networks of exchange. Within three years of this event, Banks and Pennant were both participating in major voyages. Pennant traveled across the wilds of northern Scotland, taking a ship to explore the outer islands. Banks travelled to the Pacific Ocean on James Cook's first circumnavigation (1768–1771), collecting numerous species previously unknown to Europeans. Journeys through Europe and the Pacific built collections used to solidify these naturalists' reputations as authorities over knowledge of the natural world.

This book reconstructs the processes associated with the practices of obtaining, organizing, and distributing information on natural history as the British Empire witnessed a period of unprecedented contraction in the Americas and expansion into Asia and the Pacific. This involves a close study of the material culture of natural history, examining the processes of integrating manuscripts, books, illustrations, and specimens with the philosophical systems developed to apply a systematic structure to nature. These all integrated with

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a production line geared toward introducing knowledge in the form of natural history books to an increasingly prevalent global society. Books facilitated the processes of accumulating and synthesizing knowledge in ever-expanding repositories. Mid-eighteenth-century notions of production lines for natural knowledge originated from the earlier accounts set out by the philosopher and lord chancellor of England Francis Bacon in his posthumous *New Atlantis*, published as part of *Sylva Sylvarum: Or a Natural History in Ten Centuries* (1670). Bacon's work included a description of the fictional institution "Solomon's House" that outlined how the practical aspects of knowledge production embodied in a mechanized workshop were intimately connected to philosophical ideas. Bacon initiated a division between natural history and other philosophical pursuits, notably natural philosophy, establishing an intent to develop standardized approaches for gathering and systematizing empirical facts on nature.[3]

The past twenty years have seen an increased interest from historians in the systems employed to gather and organize information during the seventeenth and eighteenth centuries. The question remains, however, as to what exactly happened to this knowledge? How did information sourced, compiled, and organized across global networks reach its intended audience? And to what extent was it used? Central to this is integrating our understanding of natural history with the history of books. Although there has been a recent surge in literature on the rise of scientific publishing, this concentrates on journals while often overlooking the production of more substantial monographs.[4] Much previous work examines seventeenth-century processes of synthesizing information formed from both manuscript and print to construct books on topography, antiquities, and natural history. Here, I extend scholarship by Elizabeth Yale and others into the global world of the eighteenth century, where the disciplinary divides initiated by Bacon become defined while solidifying the relationship between natural history and imperial expansion.[5] Studies examining the practices of managing textual illustration and scientific illustrations, which dominated the practices of natural history from the late seventeenth century, have remained disconnected with scholars often confining analysis to image or text while overlooking the inherent connections between these two media.[6] There is also a substantial divide between studies of systems of classification and the material practices of natural history. Many accounts of the development of

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philosophical systems overlook the practical collaborative approaches naturalists used to produce printed books that remained central for the simultaneous standardization of working practices and philosophical approaches across continents.[7]

This book asks the question as to what books did to stimulate the formation of new global natural histories. It combines the processes of producing printed books with the practices of natural history. Understanding these processes, from the initial collection of specimens through to the use of the finished volumes that stimulated further global natural history enterprises, moves attention away from the existing focus on private and public museum collections as the main sites for knowledge production.[8] Rather, though integrating a study of natural history with the history of books, this analysis will show, in Robert Darnton's terms, how "the history of books must be international in scale and interdisciplinary in nature."[9] Natural history books were not only constructed to disseminate knowledge, but shaped practices of collecting on both philosophical and practical levels. This necessitates a detailed exploration of the use and construction of books alongside practices of natural history and the networks that governed knowledge exchange.

Visions of Natural History

The years between 1760 and 1820 are a particularly productive period through which to address the practices of natural history. These decades coincided with a huge expansion in British trade and industry after the financial ruin that followed the successive wars in the Americas, including the Seven Years' War (1756–1763) and the American Revolutionary War (1775–1783). The unprecedented economic recovery in Great Britain and its empire has led C. A. Bayly to refer to this period as the most "dramatic example of national resurgence" and the beginning of global "modernity." As a result of American independence, Britain began to look to Asia and the Pacific for trade and resources.[10] British expansionism was central to the changes made to the daily workings of empires and states, through which natural history was connected as a discipline that relied on the identification, illustration, and publication of species discovered on a global scale. The increased geographical range of species entering Britain connected natural historians to the wider world, stimulating naturalists' interests in distant regions and their attempts to shape the research

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practices employed when collecting information on different continents. The rapid commercial and colonial expansion of Britain into Asia and the Pacific facilitated the emergence of standardized practices used by individuals across the globe, fuelling the development of collecting practices and increasing the number of new publications to extend an era of uninterrupted progress in natural history.[11] Natural historians received and distributed material throughout Europe, the Americas, Asia, and the Pacific, a feat accelerated by the growth of the British book and periodical trade. To contextualize these issues, the main concentration here will be on working practices exhibited across the networks established by particular naturalists. These include Joseph Banks (1743–1820) and Thomas Pennant (1726–1798), in addition to figures such as Gilbert White (1720–1793), whose brother was the notable Fleet Street natural history publisher Benjamin White (1725–1794). Despite their different levels of personal wealth brought about through private landownership, it is possible to place these individuals within the group of "gentlemanly" or "genteel" naturalists, a subset that dominated British natural history and natural philosophy between 1760 and 1820.[12]

Although the eighteenth-century pursuit of natural history has been widely studied, scholarship has tended to concentrate on its integration with the centralizing attempts of states in Continental Europe. In France, in the lands governed by the Hapsburgs, and in other regions such as the Dutch Republic and Scandinavian states, there were consistent attempts to combine practices of natural history and natural philosophy with emergent national agendas. This developed more professionalized disciplines that were integrated into a state bureaucracy and initiated the standardization of approaches to organizing information. Practices of recordkeeping were embodied through cameralism, or the science of administration and recordkeeping, a philosophic approach aimed at the improvement of all levels of society, from state bureaucracies to household management. As David F. Lindenfeld has shown, cameralism was central for aligning these practices, which included natural history and natural philosophy, with the objectives of emergent European states during the eighteenth-century.[13] Interests in communicating, analysing, and manipulating vast quantities of information inspired practices of reducing nature to numerical values, aspects that became essential for defining standards, facilitating imperial expansion, and solidifying the power of

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states by the nineteenth century.[14] In France institutions such as the Jardin du Roi and Le Muséum national d'Histoire naturelle attracted state funding in an attempt to create central sites for producing natural-historical knowledge. As several historical works have shown, European governments made the roles of natural historians' official paid state appointments with the remit to accompany voyages of discovery due to the professed economic advantage of the new species they collected. Naturalists such as Carl Linnaeus (1707–1778) advocated cameralism, aligning natural history with economic ideas of import substitution to avoid the drain in state bullion reserves brought about by international trade.[15]

As Roy Porter emphasized, however, the British state did not play this interventionist role. The British, unlike the continental powers, were not concerned with the depletion of bullion. Indeed, a major source of their revenue came from the resale of Oriental goods on continental markets.[16] By the mid-eighteenth century, Britain did not have the same bullion shortages as its continental neighbours. This reduced the perceived need to align scientific practices with the state. Natural historians rarely received official appointments on voyages of discovery. If they wished to participate, it was expected for naturalists to fund themselves and contribute to the overall costs of the enterprise. Emergent institutions, such as the British Museum, remained insignificant and underfunded. A lack of intervention from the state allowed natural history in Britain to develop as a field of enquiry dominated by private landowners ranging from aristocrats to rural vicars. Although, as Richard Drayton has suggested, many British initiatives such as the foundation of the Royal Botanic Gardens, Kew, were stimulated by Bourbon reforms and continental cameralist outlooks, there was far less governmental control and the management of these enterprises was left to the independently wealthy. For example, Kew was not considered a "public" garden until the 1840s. Practitioners used their wealth from landed estates, emergent industries, and international trade to fund private research programs, using these to practice and patronize natural history to maintain and advance their positions in society.[17]

The dispersed state of natural history has correlations with British industry, which thrived from an abundance of natural resources, private wealth and investment, access to the largest free trade area in the world, and a lack of state regulation. This marks the emergence

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of a laissez-faire economic attitude in the face of centralized political structures and administration bought about through the Jacobite risings. Economic freedom and a lack of state regulation has certain correlations with the fragmented nature of scientific development in Britain. The different doctrines associated with various branches of natural history influenced the systematic approaches naturalists used to classify nature. These research programs, independent of state influence, reflected typical British, or more particularly English, enlightened attitudes. It was a very different case in France, arguably Britain's greatest rival of the period, where philosophes such as Voltaire encouraged a unified effort to remove despotic autocrats and the corrupt Catholic Church. This resulted in an increase in interventionist policies used by the state to align scientific practice with a growing national agenda. In comparison, the Glorious Revolution of 1688 had imposed certain limitations on the power of the British monarchy and some religious tolerations had been introduced for nonconformist Protestants in 1689. Combined with economic independence, this gave individuals the ability to define themselves as independent gentlemen, a major symbol of the Enlightenment in Britain, which intertwined natural history with concepts of freedom brought about through private property ownership, wealth, and education. To emphasize a connection between landed wealth and natural history, many sought to distance themselves from other emergent naturalists who made a living by selling their manuscripts to publishers. These included figures such as John Hill and Oliver Goldsmith, regarded by many as little more than literary hacks who exploited the content of recent natural history publications to earn a living from growing commercial publishing markets.[18]

Genteel Naturalists

The decentralized character of British natural history and the relative freedom of individual practitioners from religious persecution, press censorship, and stamp duties levied on political publications and newspapers—together with attempts by the state to align itself with private research programs—led to the emergence of a wide array of different practices. These were dominated by private individuals who maintained independent incomes secured by private property ownership.[19] Often defined as "genteel" or "gentlemen," a title ascribed to those who interacted with and built positive reputations

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in the learned circles of "polite society," individuals within this group ranged between aristocrats, local gentry, wealthy yeomen farmers, and professional figures (such as physicians), through to parochial clergy. Natural history gave the lower and middle ranks of genteel society an opportunity to define themselves as connoisseurs of a particular subject and integrate themselves with aristocrats, upper gentry, and landowners through distributing useful information based on their observations and natural history collections. Practices of accumulating useful knowledge on nature joined these groups through their shared interests in improving property across the wider empire, emergent nations, country estates, individual parishes, and gardens. The distribution of useful knowledge within polite society provided an opportunity for social advancement, showing how this was not tied to wealth but relied on the perceived novelty and usefulness of the information disseminated throughout genteel networks.[20] This was in spite of the fact that many genteel naturalists had a lower annual income than emergent industrial elites, who were often excluded from more traditional networks since the maintenance of businesses was seen to leave insufficient leisure time for the genteel pursuits of polite society. Despite the difficulties obtaining entry to this group, the flexibility within British genteel society was very different to ancien régime France, where social mobility between the three rigidly defined estates remained infrequent and advancement had to be ratified by official state appointments.[21]

The ability to define oneself as *genteel* was important for practitioners of natural history and natural philosophy since it validated their claims on the natural world and associated these with the circulation of truthful information. Many had received a university education and were deeply committed to notions of improvement in all areas of society through the application of natural philosophy and natural history.[22] As Steven Shapin has suggested, the supply of truthful information was a central pillar of gentlemanly etiquette and played into colonial communication networks that, since the late seventeenth century, had been dominated by this group, many of whom invested their surplus income into joint stock companies, international trade ventures, and plantations. Some defined their genteel standing through positions in government offices, emergent banks, and the church, appointments many combined with an interest in natural history that was quickly integrated into their colonial

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endeavors.[23] Genteel positions in society were brought about through wealth and the communication of "useful knowledge," an essential attribute that connected those defined as *genteel* throughout the world. Genteel naturalists aligned their own standing with that of Indigenous informants, ranging from parochial clergy in northern Scotland to local elders and priests in the South Pacific, whose social position and knowledge of their surroundings validated the information they supplied. This was essential for establishing relationships with correspondents and individuals referred to as "go-betweens," maintaining a continual supply of information from correspondence networks and through the people naturalists met on expeditions.[24] The relative flexibility of British notions of gentility facilitated communication among different social, economic, and cultural groups, encouraging a diverse supply of useful information while facilitating the collaborative collection, synthesis, and redistribution of information on natural history.

My concentration on three main individuals is designed to facilitate engagement with the practices employed by the full range of naturalists encompassed by genteel society. Out of these, two naturalists dominated the practice of natural history in Britain through their ownership of extensive private natural history collections and publication programs. One is Joseph Banks, a botanist and president of the Royal Society of London from 1778 until his death in 1820. Banks represents the highest ranks of gentlemanly naturalists and assembled a huge natural history collection and library in his London mansion at 32 Soho Square. This was maintained by numerous staff whilst Banks stimulated a vast global correspondence network. Banks's activities were funded by private wealth generated by estates in Lincolnshire and the Midlands, which by 1820 brought him an annual income of £16,000.[25] The second is Thomas Pennant, a member of the Welsh country gentry, who maintained a large natural history collection and library at Downing Hall, the house on his estate in Flintshire, North Wales. When compared to Banks's landholdings, Pennant's estate was more modest since he was descended from wealthy yeomen farmers, placing Pennant toward the middle tier of genteel society.

The lower rungs of the genteel naturalists include figures such as Gilbert White, curate of the rural Hampshire parish of Selborne, who kept what he described as "a little shelf of natural history" in his home at the Wakes.[26] White had a modest income and did not have the resources to indulge in the trappings of emergent consumer society.

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Indeed, by the time of his death in 1793, the total value of White's personal possessions did not exceed £30.[27] White's family were well-known to polite society, although their lower economic status ensured that he maintained connections with a growing mercantile elite whose lack of leisure time often excluded them from traditional genteel circles. A typical example is White's younger brother, Benjamin, who was far better known to contemporaries for his prominent bookselling and publishing business. From 1766 this was based under the sign of Horace's Head at 63 Fleet Street and specialized in works of natural history. Benjamin White was responsible for publishing Pennant's and his brother's works. Although few archival materials survive concerning White's business, it is clear that this featured as central node in natural history circles and was well-known to Banks and Pennant. The relationship between Gilbert and Benjamin White is a typical example of a younger sibling who moved to London to establish a business designed to cater for polite society, representing the crossover and relative confusion between these ranks that emerged toward the mid-eighteenth century.

The different levels of wealth encompassed by genteel circles ensured Banks, Pennant, and White all knew one another and exchanged information. Landowners of varying degrees represented by Banks, Pennant, and White characterize the largest and most established component of genteel society.[28] Elite landowning naturalists held distinct notions of who was eligible to engage with natural history. This is in sharp contrast to physicians such as Erasmus Darwin, John Hunter, and Robert Thornton, who often published to supplement their incomes and promote their medical practices to wealthy clients. For example, Erasmus Darwin (1731–1802) was paid "ten shillings a line" for his *Loves of the Plants*, part 1 of his immensely popular *Economy of Vegetation* (1791). It is evident that Darwin and other physician-authors viewed these payments for their time and expertise as having correlations with their medical fees.[29] In comparison, Banks, Pennant, and White each developed a diverse natural history collection. These emanated from research programs across the fields of botany and zoology that were facilitated and extended by communication throughout genteel circles.

Unlike other well-known naturalists of the period who are remembered for developing new systems of classification, Banks, Pennant, White, and many other genteel naturalists did not make any

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