

Notebooks, English Virtuosi, and Early Modern Science

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In a letter of March 1693, the German polymath Gottfried Wilhelm Leibniz confessed to the ineffectiveness of his note-taking, sketching out a situation perhaps too familiar to many modern academics:

‘After having done something, I forget it almost entirely within a few months, and rather than searching for it amid a chaos of jottings that I do not have the leisure to arrange and mark with headings, I am obliged to do the work all over again’ (p. 155).

Like many of his contemporaries, Leibniz’s approach to his studies was shaped by the prescriptive norms of orderly note-taking that had been established by Renaissance humanists, and thereafter promoted in university curricula and practiced by generations of scholars. Leibniz clearly understood that his ‘chaos of jottings’ was not amenable to productive study and that his notes should be placed under appropriate heads in notebooks if they were to act as helpful aids to memory and prompts for recollection.

The relationship between memory, notes and information is the focus of Richard Yeo’s innovative new book, which documents the note-taking practices of a number of English virtuosi. Drawing on an extensive range of personal notebooks, from the well-known figures of Robert Boyle and John Locke to the lesser-recognized characters of Restoration Science, such as John Beale and Robert Southwell, Yeo presents a vivid account of how notebooks were conceived within the framework of the new, empirical sciences. He uses notebooks to explore attitudes towards memory and information, but relates this to a central narrative that explores how the demand for detailed, empirical data, required for Baconian ‘histories’ of nature, prompted a ‘reconfiguration of the balance between memory and other ways of storing information’ (p. xii) and consequently a rethinking of the use of notebooks in 17th-century scientific practice.

The notebook, in particular the commonplace book, represented somewhat of a paradox, for it belonged to an older, textual mode of learning that was often criticized by the ‘moderns’, yet it provided the necessary means for virtuosi to record and store new, empirical information. Yeo therefore carefully avoids the dichotomy between ‘bookish’ and empirical inquiry, building on important work that has reported the interplay between humanists and scientific figures.⁽¹⁾ He argues that English virtuosi used notebooks in both ‘traditional and novel ways, as aids to memory and records of information’ (p. 5), and details how they

developed an established practice in order to meet the new challenges of empirical inquiry. By presenting Bacon as a mentor on note-taking for many English virtuosi, Yeo places additional emphasis on the influence of Baconianism within the Royal Society, convincingly arguing that it was he who gave note-taking 'a rationale suited to the empirical sciences' (p. 255). To Bacon and his disciples, note-taking could be part of 'a process of discovery', a means 'to direct our enquiree', rather than just a method for collecting choice examples from textual authorities (p. 23, p. 255). The habit of literary commonplacing therefore gradually developed into a technique for storing extant and new information, and to group 'particulars' together in intellectually useful ways.

The first chapter provides an introduction to the terms and objects of Yeo's study and the 'notebook culture' of the early modern period. Yeo shows how the English virtuosi's note-taking habits drew upon older disciplines and were 'enmeshed within a range of humanist, legal, and social ways of inquiring' (p. 2). Here, he expresses his intention to consider the practice of note-taking as a way of investigating ideas of memory and information in the early modern period. However, this is not explicitly what Yeo's study does; as he acknowledges, his is a study of the attitudes of a rather small group – the scientific community of late 17th-century England – and their attitudes towards reading, memory, and information. Their ideas provide a significant, yet partial picture, and Yeo later clarifies that he does not claim that these men were representative of early modern note-takers. Nevertheless, his study provides important conclusions for historians of science and historians of the book, showing how the different ways these virtuosi used their notebooks reflected how they viewed and handled the challenges of empirical inquiry and the accumulation of natural knowledge.

Yeo sets his study up nicely by providing a detailed discussion of the terminology he employs. 'Science' is often an uncomfortable term for many early modern historians, yet he shows that attempts were made in the late 17th century to make the 'new philosophy' synonymous with contemporary ideas of 'science', a body of systematic knowledge. The term 'virtuosi' is justified via evidence that shows how the fellows of the Royal Society often referred to themselves as such, for it is chiefly the network of the early Royal Society whose notebooks and ideas that Yeo examines, rather than a broader grouping of learned individuals interested in antiquities, curiosities and the arts as well as the empirical sciences. Yeo goes on to address the different forms of popular notebooks, from the waste-books, journals, and ledgers often used by merchants to the common-place book favoured by humanist scholars, explaining how the virtuosi adopted the latter method to new purposes and blended it with the journal. This had implications for the function of memory and Yeo outlines the various ways 'memory' had been conceived, from the cultivation of the art of memory in antiquity to the experimental work of modern psychologists of the late 19th and early 20th century.

The following chapter looks at the humanist and Jesuit traditions of note-taking, and explores the relationship between note-taking and memory in greater detail. In humanist pedagogy, notebooks were desired to act as prompts to recollection and thus facilitate memory. The renaissance was the 'age of memorizing', and Yeo shows how the art of memory continued to be acknowledged as an admirable trait of the learned individual. John Aubrey's *Brief Lives*, for instance, celebrates strong memory in a good number of his character portraits. However, not all opinions on memory, and indeed practices of note-taking, were uniform; while Aubrey regarded reading 'without book' as distinctly positive, John Locke used the phrase in a more derogatory way. The wide scope of empirical inquiry led scholars to rethink the limits of personal memory and seek other ways of storing information. Methods of note-taking deviated from earlier norms, as some individuals began to take notes as they occurred in reading and then later allocated them to appropriate heads. Amongst many other examples, Yeo uses John Evelyn's commonplace books to show how notes could be adapted and accommodated to the Baconian project. Notebooks began to function not just as repositories of material that scholars sought to memorize, but also as places for securing and retaining a vast amount of 'particulars' that could never be retained within individual memory.

This leads onto the next chapter which fully explores the demands of compiling Baconian histories and, what Yeo calls, the 'empirical sensibility' of the English virtuosi. Yeo comes to some interesting conclusions by deconstructing the idea of empiricism; an 'empirick' was invariably a pejorative term,

especially within medical communities, but gradually acquired a more positive association as it came to be linked with information acquired by personal experience. However, Yeo is right to point out that we should not overlook other forms of empirical information, because, as the case of Boyle most clearly shows, books, testimony, and conversation formed an important part of the virtuosi's source base, as much as experiment and observation. The scale of inquiry meant that virtuosi had to consider how this wealth of information was to be managed, and Yeo suggests that the notebook became crucial to compiling and comparing the mass of empirical particulars. Even Bacon recognized that a comprehensive history of nature would overtax memory and stressed writing as a way of collecting and collating information. There was an increasing sense among virtuosi that this project exceeded any one lifetime and that a Baconian natural history must be the product of a collaborative effort. Personal note-taking therefore had to be disciplined and methodological if these records were to serve cooperative goals.

Chapter four is the first of four chapters that look at key scientific individuals and their approaches towards note-keeping. This chapter looks at Samuel Hartlib and his circle of correspondents, and details their attempts to hasten the process of collecting particulars. The millennial beliefs often associated with the circle had implications for how these men approached the Baconian project, as Yeo articulates: 'The fast approaching millennium did not allow sufficient time for the slow progress Bacon envisioned' (p. 100). Yeo skillfully links this to the various techniques developed by Hartlib and his associates that were designed to accelerate the collection of particulars and the discovery of new ideas. These practical tools or 'shortcuts' included keys, indexes, compendia, shorthand and artificial languages. Indeed, Hartlib's *Ephemerides* was essentially a diary of information and contained numerous running commentaries on gathering, collating and indexing data as well as the data itself. Yeo proceeds to provide a vivid account of the various technologies designed by Hartlib's associates, which sought to condense and order information into something more manageable. William Petty developed a 'double-writing machine' that enabled an individual to write two resembling copies at the same time, while Thomas Harrison invented a cabinet that housed notes on hooks which were ordered alphabetically and arranged into topic headings. Harrison's indexing technique solved the problem of knowing how much space to attribute for topics in notebooks, and facilitated the movement of notes to different categories, also allowing them to be lent to inquiring individuals. These devices, among many others, were designed to quicken and condense the accumulation of knowledge.

The next two chapters explore Robert Boyle's attitudes towards memory and information and analyze his mode of note-taking. The first of these, 'Rival memories', considers Boyle's early writings and places his approach to memory and note-taking in opposition to others within the Hartlib Circle. Where Hartlib and Beale saw the organization of knowledge as aiding memory, Boyle avoided condensing and arranging material for he feared this led to premature theorizing, and instead emphasized 'accumulated experience' as the chief means to impress information on the memory. In an exchange of letters in the early 1660s, Beale urged Boyle to arrange his material more systematically for the sake of his reader and for the effective organization of his own manuscripts. Beale's technique relied on a highly structured arrangement of material, but Boyle had no interest in organizing his notes this way, for he believed more time and collective effort were needed before general theories could be reached. Boyle therefore developed his own form of writing – 'loose tracts' – which dealt with new information as it appeared. This is the subject of the following chapter, which shows how Boyle's system of note-taking flouted advice that, in order to guard against the natural weakness of personal memory, information should be gathered under topical heads in bound notebooks. Boyle's method had flexibility, for notes could be moved around and re-arranged, which also prevented premature systematizing, yet it increased Boyle's reliance on his personal memory to remember and recollect information. This reflected Boyle's optimism about the capacity of memory to recall material without the aid of external notes. In the words of Yeo, 'his practice exemplified the well-known dual function of notes as both promoting and relieving memory'.

Chapter seven draws attention to the notebooks of John Locke, who outlined a 'formalized description' of his note-taking practice in his 'New Method'. Yeo dispenses with Ann Moss' assertion that by Locke's time the commonplace book was regarded as a 'lowly form ... confined to the backwaters of intellectual activity' (p. 176), presenting Locke as one of the many 'counter instances' who continued to use the commonplace

book, albeit in a way adapted to his own purposes as well as the Baconian ethos. The division of Locke's notes into books of 'physica' and 'ethica' reflected his personal and professional interests in medicine and philosophy, while his creation of a weather register and a travel journal to collect detailed particulars responded to the empirical project and were developed with the interests of Boyle and other virtuosi in mind. Locke employed quite an innovative method of indexing entries as they were made, grouping information under subjects represented by letter/vowel codes. However, this method had numerous implications. Firstly, it worked more effectively when subjects were allocated to different notebooks (unlike his travel journal) for it reduced the number of heads. Secondly, Locke saw notebooks as a way to 'avoid undue reliance on memory and recollection', yet this method of indexing was highly personalized and could not be scanned and easily interpreted by others.

As Yeo points out, Locke's activity was individual not institutional, and the last chapter explores proposals and projects for ensuring how individual notes could have collective value. First of all, Yeo briefly discusses the central role of the Royal Society's secretary Henry Oldenburg and his attempts to guide the note-taking of correspondents, shaping their observations into the form desired by the Society. He describes the register book of the Royal Society and the *Philosophical Transactions* as 'institutional notebooks', but there is much more to be said about this, and the role of the secretary in shaping and archiving material, than perhaps Yeo gives space for. He moves on to discuss the working relationship between naturalists John Ray, Martin Lister and Francis Willoughby as an example of collective note-taking. This case demonstrates how good note-taking was not only necessary for securing information, but for allowing this information to be shared and integrated into the notes of others. However, Yeo rightly raises doubts about how these notes could function outside a small collaborative relationship that had been cultivated over years of close contact. Lastly, Yeo presents the 'tantalizing, albeit undelivered' ideas of Robert Hooke, who sought to develop a 'philosophical algebra' that reduced knowledge to basic units (p. 247). Like members of the Hartlib circle, Hooke saw the reduction of data as easing memory and recollection, contracting it 'into as little space as is possible'. Hooke outlined ideas for a set of institutional notebooks called 'repositories', where short notes on slips of paper could be moved around, providing a degree of flexibility that the human mind lacked. Hooke's solution to the weakness of memory – his own being a particular concern of his – was thus to collect and store information in an institutional archive over time, but to process this information as it was gathered.

Yeo has written an intelligent, well-researched, and informative account of the practice of note-taking in early modern science. His work makes valuable contributions to the history of science, the history of the book and the cultural history of information, and for this reason will be of interest to students and scholars of each of these disciplines. Although the virtuosi he examines belong to a very particular fold, Yeo succeeds in his objectives (as outlined in the preface) of showing the overlap between philological and empirical sensibilities, the relationship between manuscript and print cultures, and the links between personal memory and external records, whilst most significantly showing how the notebook was central to the practice of the 'new science'. His discussion focuses more on individual conceptions of memory and use of notebooks, rather than collaborative or institutional practices, but nonetheless provides a vivid sense of the challenges of empirical inquiry. *Notebooks, English Virtuosi, and Early Modern Science* is both broad in coverage and thorough in detail and, in that sense, resembles the kind of Baconian history that his virtuosi strove for.

Notes

1. For instance, see Barbara Shapiro and Robert G Frank, *English Scientific Virtuosi in the Sixteenth and Seventeenth Centuries*, (Los Angeles, CA, 1979); Anthony Grafton, *Defenders of the Text: The Traditions of Scholarship in an Age of Science 1450–1800*, (Cambridge, 1991); Ann Blair and Anthony Grafton, 'Reassessing humanism and science', *Journal of the History of Ideas*, 53, 4 (1992), pp. 535–40; Richard Serjeantson, 'Testimony and proof in early modern England', *Studies in History and Philosophy of Science*, 30, 2 (1999), pp. 195–236. [Back to \(1\)](#)

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