Introduction

We describe ourselves as living in an information age as if this were something completely new. In fact, many of our current ways of thinking about and handling information descend from patterns of thought and practices that extend back for centuries. This book explores the history of one of the longest-running traditions of information management—the collection and arrangement of textual excerpts designed for consultation in what I call, as a convenient shorthand, "reference books."[1] Large collections of textual material, consisting typically of quotations, examples, or bibliographical references, were used in many times and places as a way of facilitating access to a mass of texts considered authoritative. Reference books have sometimes been mined for evidence about commonly held views on specific topics or the meanings of words, and some (encyclopedias especially) have been studied for the genre they formed.[2] My purpose in studying reference tools in early modern Europe, and how they were conceived, produced, and used by contemporaries, is to gain insight into the ideals and practices of what one can anachronistically call "information management" in a period prior to our own. To that end I have combined a wide contextual net, spanning multiple periods, places, and reference genres, with a specific focus on several exemplary general reference books in Latin that were in print between 1500 and 1700.

The term "information" has a long history, attested in English from the fourteenth century in the sense of "instruction" and from the fifteenth century in the sense of "knowledge concerning some particular fact."[3] We use it today in many contexts, from biology, which studies the transmission of information at many levels, from DNA to neural processes, to computer science, which analyzes information mathematically without attention to its semantic content.[4] More colloquially, the notion of an "information age" (a term coined in 1962) is premised on the idea that computers radically changed the availability and methods of producing and using higher-order information (e.g., as recorded in language or numbers).[5] I use the term "information" in a nontechnical way, as distinct from data (which requires further processing before it can be meaningful) and from knowledge (which implies an individual knower). We speak of storing, retrieving, selecting, and organizing information, with the implication that it can be stored and shared for use and reuse in different ways by many people—a kind of public property distinct from personal knowledge. Furthermore, information typically takes the form of discrete and small-sized items that have been removed from their original contexts and made available as "morsels" ready to be rearticulated.[6]

I follow other scholars in applying the term to premodern contexts, cautiously due to the risk of anachronism, because it is effective in describing how authors and readers of early reference books handled their material, even though they themselves articulated their goals in terms not of information but of knowledge and edification. To use actors' categories, that is, the terms most commonly used at the time, early reference books were designed to store and make accessible words and things (*verba et res*).[7] These ranged from definitions and descriptions from the natural world (e.g., this plant has that property or that phenomenon has this cause) to human actions and sayings (X wrote this book, Y said that in these circumstances, this happened to Z). The authors of reference books presented themselves as compilers, responsible for the accurate reporting of what others had written elsewhere but not for the veracity of those statements themselves. Compilers were therefore conveyors of information rather than of their own opinions or positions (as I discuss in chapter 4). As such they would also boast of the many and diverse sources from which they had gathered material; they might name and list their sources, but they did not discuss them or offer a contextual interpretation of the material they selected. Instead readers were exhorted to use their own judgment and to pick and choose from among these treasuries something to suit their needs, a nugget to integrate into their own knowledge production, whether oral or written—typically a composition of some kind (e.g., oration, letter, or treatise). For these reasons I argue that the authors and users of premodern reference tools were indeed engaged in "information management" before either term had been coined.

These days we are particularly aware of the challenges of information management given the unprecedented explosion of information associated with computers and computer networking. One study has estimated that 5 exabytes of new information (an exabyte is 10^{18} bytes) was produced in 2002, 92 percent of it stored on magnetic media, and that "new stored information grew about 30 percent per year between 1999 and 2002."[8] We complain about overload in almost every field, from hardware-store stocking to library holdings to Internet searches.[9] A Google search for "information overload" itself generates more than 1.5 million hits, with the promise of solutions from office supply stores, management consultants, and stress relief services, among many others. But the perception of and complaints about overload are not unique to our period. Ancient, medieval, and early modern authors and authors working in non-Western contexts articulated similar concerns, notably about the overabundance of books and the frailty of human resources for mastering them (such as memory and time).

The perception of overload is best explained, therefore, not simply as the result of an objective state, but rather as the result of a coincidence of causal factors, including existing tools, cultural or personal expectations, and changes in the quantity or quality of information to be absorbed and managed. It is also a plausible and interesting suggestion (but not one that I have the expertise or the method to assess) that what we take to be innate human capacities, say, of memory and recollection, change over time under the impact both of cultural expectations and of the technologies with which we operate.[10] But the feeling of overload is often lived by those who experience it as if it were an utterly new phenomenon, as is perhaps characteristic of feelings more generally or of self-perceptions in the modern or postmodern periods especially. Certainly the perception of experiencing overload as unprecedented is dominant today.[11] No doubt we have access to and must cope with a much greater quantity of information than earlier generations on almost every issue, and we use technologies that are subject to frequent change and hence often new. Nonetheless, the basic methods we deploy are largely similar to those devised centuries ago in early reference books. Early compilations involved various combinations of four crucial operations: storing, sorting, selecting, and summarizing, which I think of as the four S's of text management. We too store, sort, select, and summarize information, but now we rely not only on human memory, manuscript, and print, as in earlier centuries, but also on computer chips, search functions, data mining, and Wikipedia, along with other electronic techniques.

Of course reference books constitute only one form of information management, trained on textual information—words or sentences or bibliographical details, which were selected, collected, and made accessible in some kind of order. Information of many other kinds was also stored, transmitted, and managed in pre- and early modern cultures—in collections of objects, natural and artificial (in cabinets of curiosities, museums, botanical and zoological gardens), in the records of commercial or administrative transactions (archives), or in the oral or experiential transmission of skills and speech in all kinds of settings (home, marketplace, or workshop). Recent scholarship has in many cases begun to examine these forms of accumulation as sites of information management, each of which posed distinctive practical, intellectual, and political challenges. In due course, by drawing on many specific studies, we can hope to identify parallels and lines of exchange in methods of working and organization, over time and across different areas, for example, between the treatment of words and of things and among scholarly, mercantile, and administrative practices.[12] In this book I focus on two areas of especially active accumulation in the Renaissance: manuscript notes and printed reference books inspired by the humanist study of ancient language and culture. I find that the two are closely connected: reference books were initially formed from the reading notes taken by their compilers, and in turn they offered buyers a stockpile of notes ready for use without the difficulties of taking them directly.

Developed from medieval and ancient models, early modern reference tools spanned a wide range of genres that can be difficult to distinguish from one another by hard and fast criteria. Setting aside the specialized reference books in theology, law, and medicine, I focus on the genres that offered access to information that was considered essential for the educated in any occupation. These comprised principally (using current category terms): dictionaries of words (mono- and polyglot) and of things (e.g., biographical and geographical dictionaries), collections of quotations or of historical anecdotes, and miscellaneously arranged commentaries designed for consultation through an index. In addition I consider various kinds of "books about books," such as bibliographies and library and booksellers' catalogs, which guided readers toward other books. Depending on their arrangement (alphabetic, systematic, or miscellaneous), reference works typically deployed one or more finding aids, including tables of contents, alphabetical indexes, outlines, dichotomous diagrams, cross-references, and a hierarchy of sections and subsections made visible on the page through the use of layout, symbols, and different scripts or fonts. Of course many other kinds of early modern books were meant to be consulted, including how-to books or books of recipes and secrets, for example, and relied on the same range of finding devices, but I have focused on the major humanist reference genres because their exceptional size and broad scope offer especially good opportunities to study the methods by which they were composed, arranged, and used.[13]

The four S's approach to managing an ever-increasing accumulation of material was not the only response to the information explosion in the early modern period. Instead of methods that coped with ambitious accumulation of information, René Descartes (1596–1650), for example (among other seventeenth-century thinkers calling for an overhaul of received philosophy), recommended ignoring the accumulated stock of texts and starting afresh to ground philosophy from first principles: "Even if all knowledge could be found in books, where it is mixed in with so many useless things and confusingly heaped in such large volumes, it would take longer to read those books than we have to live in this life and more effort to select the useful things than to find them oneself."[14] The accumulation of past authorities had become so great and so discordant that it seemed to Descartes simpler to do without them. Although others shared Descartes' scorn for ancient authority (including Francis Bacon in some passages), a mastery of ancient culture and literature remained central to European education and the principal criterion of distinction between the educated and the uneducated. But the rejection and drastic culling of accumulated information always held intermittent appeal: mystics, for example, generally emphasized divine inspiration rather than the management of accumulated human knowledge; after Descartes, who reported that his new philosophy came to him in a dream, the rejection of received opinion became a stance common even among authors who were otherwise consumers and producers of information. In the eighteenth century a number of writers articulated fantasies of destroying useless books to stem the never-ending accumulation: for Gibbon the books to destroy included "the ponderous mass of Arian and Monophysite controversy"; for d'Alembert, "useless historical works."[15] One critic has identified the articulation of the sublime as another kind of response to overabundance; Kant and Wordsworth are among the authors who described an experience of temporary mental blockage due to "sheer cognitive exhaustion," whether triggered by sensory or mental overload.[16] In these cases as the moment passed (whether it was sublime or destructive), the philosopher would generally return to more traditional methods of work—including those that enabled him to access and use accumulated information. Reference books certainly do not represent the full range of responses to the challenges of managing overabundant information, but they offer some of the best sources we have from which to consider how textual information was managed in the early modern and premodern periods.

My purpose in this book is not just to offer some historical perspective on our current concerns but to shed new light on the intellectual culture of early modern Europe. Neither the perception of overabundance nor the basic methods of text management (the four S's) were new or unique to the Renaissance. Furthermore, many of the features of the printed reference book, such as alphabetical ordering and indexing and consultation-friendly layouts were adapted to print from medieval manuscript practices. What was distinctive to the Renaissance was the large scale of accumulation of textual excerpts both in personal collections of manuscript notes and in printed compilations. Certainly printing facilitated the explosion in the number and size of printed reference works. Printing made it less expensive to produce books, including large ones, and aided large-scale compilation indirectly, for example, by increasing the number of books available for excerpting and by stimulating the production of paper, which was also the optimal medium for stockpiling manuscript notes. But printing and the availability of paper do not of themselves explain why the learned were willing to invest so much effort and money in amassing large collections of textual information in their manuscript notes and in printed reference books. Renaissance discoveries of ancient texts and distant places offered new material to sort and store, in addition to more traditional sources, but underlying the learned reaction to all this input was the most important causal factor of all: a newly invigorated info-lust that sought to gather and manage as much information as possible. The abundant note-takers and compilers who are the focus of my book articulated a new enthusiasm for attending to every book and every discipline in the search for potentially useful information. They hoped to safeguard the material they collected against a repetition of the traumatic loss of ancient learning of which they were keenly aware. The compilers also saw their work as a contribution to the public good that benefited from their catering to as many different themes and interests as possible.

My account focuses on large-scale compilations in manuscript and print and is not exhaustive. Some Renaissance authors advocated a restrictive canon of texts and excerpts rather than the expansive vision of those who amassed the biggest collections of excerpts.[17] But the largest reference books offer unique perspectives on both ordinary and extraordinary methods of working with texts, on the impact of printing, on the nature and spread of reference reading among the Latin-educated, and on the anxieties that this diffusion elicited. The large Latin reference works I study were designed to aid in reading and composing Latin texts, oral and written, and were used by students, teachers, and preachers and also by scholars, authors, and "men of action." Most early modern reference genres drew heavily in form and content from medieval models that originated in the thirteenth century. But by the early sixteenth century a number of new books were larger and more diverse than the medieval models on which they drew. The most successful of them went through dozens of editions, with frequent modifications and additions, down to the last decades of the seventeenth century, when most Latin reference works were printed for the last time.

These large folio books represent a tremendous collective investment of human and material resources on the part of authors and printers who produced them (ranging from the 430,000 words of Domenico Nani Mirabelli's *Polyanthea* of 1503 to the 10 million words of the eight-volume *Magnum theatrum humanae vitae* of 1631 by Laurentius Beyerlinck). The institutions and individuals who purchased them also invested significantly. Of course, as one book historian wisely pointed out, most printed books have never been read, given that printers have always speculated on the numbers of copies they would sell.[18] But these large reference works sold well, especially considering their large size and cost, and I document how they were actually used despite the fact that few authors acknowledged using them. I argue that buyers sought in them the kinds of reading notes they wished they had taken themselves if they had had the resources (time, energy, money) to read the originals of the texts excerpted there. In wondering how these reference books were physically produced, from manuscript notes to final printed volume, I have uncovered some unusual methods devised by compilers to lessen their arduous task, including the manipulation of notes on slips of paper and the cutting and pasting from manuscripts and printed works to save the labor of copying.

The working methods studied here are those characteristic of humanist and late humanist ambitions, designed to produce and display mastery of ancient literature and culture. Attention to working methods has grown in recent years in other areas of intellectual history as well. For a long time the main group of scholars attending to manuscript notes and drafts in addition to finished works were literary scholars practicing "genetic criticism" and focused on those major authors of the nineteenth and twentieth centuries for whom abundant papers were available. Some medievalists have also investigated working methods and the terms for them, notably those distinctive to scholasticism.[19] But new interest in working methods has stemmed from recent work in the history of science, specifically in the early modern period, which emphasizes the interdependence of ideas with the social and material contexts of their formation. Some studies have focused on places peculiar to scientific work, such as the laboratory, the anatomy theater, the botanical garden, or the observatory. Other studies originating in the history of science have explored contexts relevant to intellectual work more generally, including the domestic setting in which intellectuals often worked and the economy of manuscript and print in which ideas were formed and diffused. Careful attention to the work performed in various contexts has also pointed to the presence of many helpers, from wives and children to laboratory assistants and amanuenses, who were often treated as "invisible" and are difficult to identify precisely.[20] Reference books shed light on how compilers worked, in collaborations both across time and at one time, as well as how those who used them worked.

To understand the work of those who operated in the humanist mode broadly conceived—who strove to produce knowledge principally from the study of ancient texts—it is particularly helpful to learn more about the kinds of books and of reading with which they engaged. We have studies of the furniture and rooms where humanists worked and of how the best-known humanists read and annotated ancient texts.[21] But humanists and those less learned among the Latin literate had increasing opportunities between 1500 and 1700 to engage in consultation reading, accessing a text in parts thanks to finding devices, with or without pen in hand.[22] Although any book with an index or for which one had a precise reference could be read by consultation, we can learn about methods of consultation especially well by examining those genres that were designed to be consulted rather than read through. The large Latin reference works I examine here accumulated myriad small units of information (quotations, definitions, or examples) from which readers were invited to select items of interest by consulting the text itself and the accompanying finding devices. Given the compilers' promises of the accuracy of their material, reference books offered a repository of textual facts akin to the facts increasingly invoked in many areas of early modern culture, especially in England.[23] Reference books could substitute for reading or rereading, or they complemented other kinds of reading depending on the circumstances. We have a more complete picture of the reading methods used by the learned and the broader public of the Latin literate by including the kinds of books that were taken for granted—omitted from citations or direct discussion but printed and owned in ever greater numbers between 1500 and 1700.

Reference books also offer a new angle from which to consider the impact of printing in early modern Europe. Since its beginnings as a subfield in the 1980s, the history of the book has generated much new work on the impact of printing and the notion of "print culture." Elizabeth Eisenstein has made the most extensive claims for the impact of printing, emphasizing the cumulative improvement across successive editions and the rapid and broad diffusion of books. Recent controversy surrounding her work has questioned whether handpress printing, with its artisanal variability and unscrupulous commercial practices, fostered the kind of standardization and reliability we associate with printing in the industrial age.[24] Another response to Eisenstein's claims has questioned the abruptness of the changes she associates with printing and suggested that late medieval manuscripts presented many of the features characteristic of the modern book, including, for example, indexes, page layout designed to facilitate consultation, and production on speculation rather than on commission in commercial scriptoria.[25] From my survey of reference works in a number of premodern settings, including ancient and medieval Europe and the worlds of Islam and China, I conclude that the central features of reference tools, including large-scale compilation, finding devices, and layouts to facilitate consultation reading, all developed independently of printing. But I also argue that in early modern Europe printing shaped in important ways the form, contents, and impact of these works.

The diffusion of printed reference books elicited a steady flow of complaints throughout the early modern period. The complaints became especially strident in the late seventeenth century, when Latin learning itself seemed threatened by the dominance of vernaculars (especially in England and France) and by the increasing sense that ancient authors and ideas should be abandoned in favor of more recent ones. I interpret these anxieties as additional evidence for the spread of consultation reading to ever-broader swaths of the educated. By the time the Latin reference books ceased being printed ca. 1700, they had spread familiarity with the methods of consultation reading, originally the purview of a narrow intellectual elite in the Middle Ages, to the much broader audience of the Latin-educated. The eighteenth century became known as the "age of dictionaries" because compilers and readers alike took for granted the justifications, tools, and methods of reference reading developed in the large Latin reference books of the sixteenth and seventeenth centuries, even though these works are little known today and had only an indirect impact on the "modern" and vernacular genres of the eighteenth century.

This book proceeds through increasingly focused layers of contextual analysis in chapters 1 to 3 before considering a few specific works in chapters 4 and 5. In chapter 1, I survey the reference genres produced in a variety of premodern contexts to highlight the remarkable similarities in the basic methods and problems of text management across many cultures and also the peculiarities of early modern Europe. In chapter 2, I argue that methods of note-taking in early modern Europe served as a more immediate context for the development of reference books in two ways: printed compilations typically originated in the collections of personal notes of one or more compilers, and they offered ready-made in print the kinds of notes readers wished to have available even if they had not taken them themselves. The accumulation of manuscript notes posed problems of management, collaboration, and sharing that also characterize printed compilations. In chapter 3, I survey the nonspecialist Latin reference genres in print between 1500 and 1700 and their finding devices, with careful attention to the terms contemporaries used to describe them and to those historians have deployed, including the notion of "encyclopedia." In chapter 4, I focus on the career and composition of several major reference works (especially the *Polyanthea* and the

Theatrum), drawing on the texts, on their printing histories, and on some extant working papers of Conrad Gesner of Zurich and Theodor Zwinger of Basel. In chapter 5, I document the reception of these reference works through surviving copies and their annotations, explicit citations and tacit use, and complaints about them. Though they were no longer in print after 1710 and were rarely acknowledged as models, the Latin reference works laid the groundwork for the explosion of vernacular reference works and encyclopedias in the eighteenth century. For some two centuries printed humanist reference genres spread the use of increasingly sophisticated methods and tools of information management among compilers, printers, and readers. These techniques were easily adapted to the modern languages and contents characteristic of Enlightenment reference works, and they are familiar enough today to remind us that many habits that we take for granted are indebted to the transmission of practices developed centuries ago in medieval and early modern Europe.