

Consuming Mathematics: John Ward's *Young Mathematician's Guide* (1707) and its owners

1. Ward's *Guide* and its success

The *Young Mathematician's Guide*, by John Ward (c. 1648–?1730), was one of the more popular mathematical textbooks of the Georgian period. Between 1707 and 1771 it seems to have been printed twelve times at London and three times at Dublin (1731, 1755, 1769).¹ Although we do not know the size of these impressions, it is likely, based on their sheer number, that more copies of Ward's *Guide* were in circulation during much of the eighteenth century than of almost any other general mathematics textbook in English.² The evidence presented later in this paper will corroborate this impression of the *Guide*'s pervasive reach, even in the early nineteenth century.³

John Ward himself was a successful mathematical practitioner, visible in our sources from the 1690s to about 1730, born apparently around 1648. Evidence for his life is extremely sparse, consisting mainly of hints on the title pages of his books and in their dedications.⁴ He seems to have read some Latin, and thus may have attended a grammar school.⁵ By 1695 he could describe himself as 'Heretofore *General Gauger* in the *Revenue of Excise*';⁶ but it is hard to be sure what degree of seniority this

¹ The *Electronic Short-Title Catalogue* lists a total of nineteen variants: London 1707 (three variant title pages; all the same setting: ESTC nos T69160, T132879, N483184), London 1713 (T132407), London 1719 (T121680), London 1724 (T120453), London 1728 (T132401), Dublin 1731 (T177984), London 1734 (T107721), London 1740 (T132882), London 1747 (T177804), London 1752 (T132403), Dublin 1755 (T121679), London 1758 (T132404), London 1762 (T132405), Dublin 1769 (three variant title pages; all the same setting: N72348, T121350, N14398), London 1771 (T127322).

² On this textbook literature in general see John Denniss, 'Learning arithmetic: textbooks and their users in England 1500–1900', in *The Oxford Handbook of the History of Mathematics*, edited by Eleanor Robson and Jacqueline Stedall (Oxford, 2009), pp. 448–467.

³ For a comparable, somewhat later case see Ian Michael, 'The Textbook as a Commodity: Walkingame's *The Tutor's Assistant*', *Paradigm* 12 (1993): <http://faculty.education.illinois.edu/westbury/paradigm/Michael.html>. Michael sees Walkingame's *Tutor's Assistant* as 'an example of a textbook which, in becoming a commercial commodity, tends to lose its identity.' Ward's *Guide*, however, presents a much simpler bibliographic situation than the literally hundreds of versions of the *Tutor's Assistant*.

⁴ See also E.G.R. Taylor, *The mathematical practitioners of Tudor & Stuart England* (Cambridge, 1954), p. 295. Ward's date of birth is implied by the information in the frontispiece to the *Guide* (1707).

⁵ See the citations of Latin authors in Ward, *Guide* (1707), pp. 177, 347.

⁶ John Ward, *A compendium of Algebra* (London, 1695), title page.

phrasing implies. From 1695 or earlier he taught mathematics in London, both at ‘*Mr. Warner’s a Mathematical Instrument-maker, in little Lincolns-Inn Fields*’ and ‘*at his House in Fanchurch-Street*’.⁷ In his later publications Ward was described as ‘of Chester’: he apparently retired there by 1713.⁸

As well as in practice and teaching, Ward exercised his mathematical skills in writing. *A Compendium of Algebra* appeared in 1695 and the *Young Mathematician’s Guide* in 1707. They were followed by two more practical works: the *Clavis usurae* (‘Key to Usury’) written in 1709 to fill a perceived gap in the market for a book on interest calculations, and in 1714 the inevitable *Practical Method, to discover the longitude at sea*. (Ward’s ‘method’ amounted to keeping a spring-driven watch sealed in a vacuum chamber; it sank without trace.) In 1730 further treatises on navigation, geometry, and plane and spherical trigonometry were edited by an anonymous friend with the help of another London mathematical practitioner, George Gordon, and published as Ward’s *Posthumous Works*, our only evidence for the date of his death and an indication of the esteem in which he was held by some. These editors declined to give any account of Ward’s life.⁹

The *Young Mathematician’s Guide* was a chunky octavo of nearly 500 pages. It was structured in five sections, covering arithmetic (142 pages in the first edition), algebra (133 pages), plane geometry (77 pages), solid geometry (35 pages), and infinitesimal (calculus-like) methods applied to problems of area and volume (35 pages). An appendix (24 pages) applied the results of the final two sections to the practical subject of gauging (the measurement and calculation of liquid volumes), included presumably because of Ward’s special interest in it. Later editions, from 1731, featured a second appendix which described some elements of trigonometry together with the history of logarithms, and, from 1740, a topical index. A number of other mathematical textbooks in this period attempted comprehensiveness in their coverage (Moore’s *Compendium* and Ozanam’s *Cursus*, for instance), but Ward was both more thorough and markedly more successful than any rival.

⁷ John Ward, *Synthesis et analysis* (single-sheet advertisement) [London, 1695], recto.

⁸ Ward, *Guide* (1707), frontispiece; A4^v shows him still living in London in October 1706; *Guide* (1713), title page, shows him living in Chester by 1713.

⁹ *The Posthumous Works of Mr. John Ward* (London, 1730), p. vii.

The *Guide* began with instructions on how to read numerals and ended with a complete derivation, using calculus, of the volumes of various solids. It was a thorough, dense and well-documented survey of the mathematics available in the vernacular in Georgian England, intentionally complete in its coverage.¹⁵ It was limited only by its avoidance, on the whole, of practical applications: besides gauging, the main practical uses Ward described were in accounting and other monetary calculations such as interest;¹⁶ other practices such as surveying or navigation he ignored.

Ward himself stated that he wished the book to be of use to ‘such as are wholly Ignorant of the very first *Rudiments* ... of *Mathematicks*’, to enable them to ‘proceed with Ease and Chearfulness’ in the subject.¹⁷ He certainly tried to begin at the very beginning, although written explanation was not perhaps the best or the most natural form in which to present the first rudiments of the subject. Ward’s lengthy, vague discussion of the nature of arithmetic, geometry and algebra, and his verbose description of how to read Arabic numerals, though they were typical of the mathematical textbook genre, surely cannot have conveyed much to the beginner.

Neither the title page nor the introduction gave any explicit indication of the age or class of the expected reader. (As to gender, Ward used masculine pronouns, but there was no explicit mention of ‘boys’ or ‘young men’: merely the perhaps deliberately neutral ‘persons’.) The book, according to Ward, was merely ‘designed to propagate Mathematical Learning amongst such as desire to be introduced into that sort of Knowledge’.¹⁸ (The appendix on gauging, however, was meant specially for those who designed ‘to undertake the *Office or Employment of a Gauger*’.¹⁹)

The title page of the first edition stated that the price of a bound copy of the *Guide* was six shillings; the price of a new copy remained consistently around that level

¹⁵ Ward, *Guide* (1707), A4^r–^v.

¹⁶ Ward, *Guide* (1707), p. 144 refers to commercial bookkeeping.

¹⁷ Ward, *Guide* (1707), A4^r, A2^r.

¹⁸ Ward, *Guide* (1724), A2^v; compare A3^v.

¹⁹ Ward, *Guide*, (1707), p. 427.

from 1715 to 1748, the period for which I have found prices in advertisements.²⁶ Second-hand copies ranged from nearly that much down to just a shilling, although the usual price from the 1750s to the 1790s seems to have been from two to four shillings depending on condition.²⁷

2. Circulation of the *Guide*

Uncircumscribed in its appeal, Ward's *Guide* had something to offer almost anyone who wished to learn some mathematics. Its success is well attested, and the main purpose of this paper is to discover as far as possible where copies of the *Guide* went and what responses they elicited.

Evidence comes in two forms. Many of the surviving copies of the *Guide* bear marks made by their early owners, and such copies are sufficiently plentiful to allow general conclusions to be drawn. At least 240 copies are held by major libraries worldwide, of which around 90 are in the UK and Ireland.²⁸ Fairly casual perusal of the catalogues of antiquarian book dealers (and even ebay) over the last few years has revealed copies of Ward's *Guide* appearing for sale in the UK at a rate of perhaps one per year or more, suggesting that a substantial number remain in private hands. For this study I have inspected 53 copies of Ward's *Guide* either directly (26 copies) or in digital or microfilm facsimile (27 copies); they are listed at the end of this paper.

Second, quite a number of references to the *Guide* are to be found in printed works of the eighteenth century: notably in sale catalogues of books and the catalogues of libraries, but also in periodicals, biographies and elsewhere. Sale catalogues must be used with some caution, since a seller's claim to be selling only the library of a particular individual on a given occasion was not always strictly true. But a few owners of Ward's *Guide* can be identified by this means with reasonable confidence.

²⁶ For example, 'Catalogue of Books' in *The works of the celebrated Monsieur Voiture* (London, 1715), vol. 1; 'Books printed for C Hitch' in Henry Scougal, *A new academy of compliments* (London, 1748).

²⁷ For example copy 1734A, front endpaper (price 4s in 1744); Thomas Davies, *A catalogue of choice and valuable books, in most languages and faculties. With the entire library of Francis Calliault, Esq* [London, 1739], p. 11 (4s); John Deighton, *A catalogue of a large and valuable collection of books* [London, 1792], p. 97 (3s).

²⁸ Data from estc.bl.uk: direct searching in library catalogues quickly reveals that the true figures are likely to be rather higher.

My selection from these kinds of evidence aims neither at completeness nor at representativeness. The survival of copies of Ward's *Guide* is problematic for reasons discussed below, while the discovery of references to it in eighteenth-century literature depends on the combination of serendipity with the doubtful accuracy of full-text searches in resources like *Eighteenth-Century Collections Online*, Gale's *British Newspapers 1600–1900* and ProQuest's *British Periodicals*. Nevertheless, the evidence seen in this study enables quite a detailed picture to be drawn.

2.1 Circulation and admiration

At a gross level, as well as the evidence of the sheer number of impressions, the success of Ward's *Guide* is attested by contemporary references to it and by evidence for its circulation throughout the British Isles and beyond. In the updated preface he wrote for the 1724 impression, Ward wrote that 'near five Thousand Persons' had already benefited from the book; by that time it had been printed three times (1707, 1713, 1719) with an average impression size, it is thus implied, of about 1700 copies. If subsequent printings were of a similar size (an admittedly heroic assumption)²⁹ the fifteen impressions of the *Guide* might have resulted in a total of more than 25,000 copies.

Those copies were regularly advertised for sale throughout the eighteenth century. Copies turned up for sale around England, for instance in York, Bath, and Northampton, and in Edinburgh.³⁰ Copies were also acquired by a few circulating

²⁹ James Raven reports that 'most book editions remained at about 750 copies', although in the surviving ledgers of the successful Bowyer firm two-thirds of orders 'were editions of 1,000 or more copies'. James Raven, *The Business of Books: Booksellers and the English Book Trade 1450–1850* (London and New Haven: Yale University Press, 2007), pp. 304, 306.

³⁰ Thomas Wilson, *Catalogue of above thirty thousand volumes ...* [York?, 1788], p. 64; William Frederick, *A catalogue of near ten thousand volumes of books* [Bath, 1770?], p. 27; John Lacy, *Catalogue of a scarce and valuable collection of books* [Northampton, 1780?], p. 105; William Drummond, *Drummond's catalogue of books* [Edinburgh, 1764?], p. 55. A valuable discussion of sale catalogues and the price data they contain is J. E. Elliott, 'The cost of reading in eighteenth-century Britain: auction sale catalogues and the cheap literature hypothesis', *English Literary History* 77 (2010), pp. 353–384; see also G. Walters, 'Early sale Catalogues: Problems and Perspectives', in *Sale and Distribution of Books from 1700*, ed. Robin Myers and Michael Harris (Oxford: Oxford Polytechnic Press, 1982), pp. 106–125.

libraries, for instance in Edinburgh,³¹ and by other institutions including, curiously, the Catholic mission at Shepton-Mallet.³²

Direct evidence for the *Guide*'s circulation in schools is elusive, and I have not succeeded in locating references to Ward in the curricula of schools or schoolmasters of the period. One copy has a supplementary interest table pasted in, produced in 1741 for Thomas Hundeshagen's mathematical school in the Strand; possibly the school was buying copies of Ward and supplying them customized to its pupils.³⁴ Meanwhile, Ward himself remarked that 'it hath been very well receiv'd amongst the Learned, and (*I've been often told*) so well Approv'd on at the Universities, in *England, Scotland, and Ireland*, that it's Order'd to be publickly read to their Pupils'.³⁵ Direct corroboration is lacking, but it is not implausible that the *Guide* could have been used in mathematical instruction at universities, and the evidence of individual owners (see below) shows that at least some acquired the *Guide* when they had passed school age.

Mathematical societies – like that at Spitalfields – are conspicuous by their absence from the evidence I have seen. Although it is easy to imagine a copy of the *Guide* being taken along to a meeting of such a society and studied or discussed there, none of the copies I have seen provides any evidence that such things really happened, and the question of whether they did must remain open.

The *Guide*'s success extended to Ireland: there were three Dublin impressions (1731, 1755, 1769), and sale catalogues show copies being sold in Cork and Dublin.³⁶ The book also travelled to British North America; copies were offered for sale in New York (1771) and Philadelphia (from 1762).³⁷ And copies were acquired by American

³¹ James Sibbald, *A new catalogue of the Edinburgh circulating library* [Edinburgh, 1786?], p. 75; also *The physiological library. Begun by Mr. Steuart, and some of the students of natural philosophy in the University of Edinburgh* ([Edinburgh], 1725), p. 49.

³² Copy 1752C.

³⁴ Copy 1724B.

³⁵ Ward, *Guide* (1724), A3^v.

³⁶ '... Books, printed for, and sold by J. PORTER ...' in *A Small sketch of geography* (Dublin, 1769); Anthony Edwards, *A catalogue of books ... Now selling by Anthony Edwards* [Cork, 1785], p. 14.

³⁷ *A catalogue of books, sold by Noel and Hazard ...* [New York, 1771], p. 17; 'Catalogue of Books ... sold by Andrew Steuart' in Edward Wettenhall, *A short introduction to grammar* (Philadelphia, 1762).

public libraries including in Philadelphia, Lancaster, and Salem.³⁸ The book is said to have been used in teaching at Harvard.³⁹

A few copies went to France. In one copy an eighteenth-century hand reports its presence at the Jesuit College in Lyons.⁴⁰ There is no indication of how it arrived there or whose hands it had passed through. Unusually for an English vernacular mathematical work, Ward's *Guide* also received a French translation. Esprit Pézenas (1692–1776), a French Jesuit based at Marseilles, translated the *Guide* in 1756, as *Le Guide des Jeunes Mathématiciens*.⁴¹ It was printed at Paris, part of a series of mathematical books published by Charles Antoine Jombert which also included works of Colin Maclaurin and Isaac Newton, as well as continental writers including l'Hopital, Jacques Ozanam and others. One copy of the French translation apparently travelled to Germany – to the Jesuit College at Munich – during the eighteenth century.⁴²

The *Guide* attracted admiring comments from educators for over a century. Commendations were written early on by Joseph Raphson, F.R.S., Humphrey Ditton, master of the mathematical school at Christ's Hospital, and the mathematical practitioner Samuel Cunn.⁴³ The book was cited by the successful gauger William Hawney in 1717 and by Charles Leadbetter, author of the *Young Mathematician's Companion*, in 1739.⁴⁴ Writers compiling courses of instruction or lists of

³⁸ *The charter, laws, and catalogue of books, of the Library Company of Philadelphia* (Philadelphia, 1757), p. 42; *The charter, laws, catalogue of books, list of philosophical instruments, &c. of the Juliana Library-Company, in Lancaster* (Philadelphia, 1766), p. 42; *Catalogue of books, for sale or circulation, in town or country, by John Dabney, at his book and stationary store, and circulating library, in Salem* (Salem, MA, 1791), p. 26.

³⁹ Frank J. Swetz and Victor J. Katz, 'Mathematical Treasures: John Ward's *Compendium of Algebra*', *Loci: Convergence* (<http://mathdl.maa.org/mathDL/46/?pa=content&sa=viewDocument&nodeId=2591&bodyId=3882>).

⁴⁰ Copy 1734B, title page.

⁴¹ *Le Guide des Jeunes Mathématiciens, ou Abregé des Mathématiques, a la Portée des Commencans* (Paris, 1756). On Pezenas see Charles Edwards O'Neill, and Joaquín María Domínguez (eds), *Diccionario histórico de la Compañía de Jesús: biográfico-temático* vol. 3 (Rome and Madrid, 2001), s.v. Pézenas, Esprit. Here and in other reference books the date of publication is given as 1757, which may indicate that there was a second edition of which I have not located copies.

⁴² Munich, Bayerische Staatsbibliothek, shelfmark Math.u.204, digitized at <http://reader.digitale-sammlungen.de/resolve/display/bsb10594352.html>; title page.

⁴³ The commendation by Raphson and Ditton appears on the title page verso in some copies of the 1713 and 1719 impressions; that by Cunn (a commendatory poem) as an added leaf at the end of the main text in some copies of the 1719 impression.

⁴⁴ William Hawney, *The Compleat Measurer* (London, 1717), A4^v; Charles Leadbetter, *The Young Mathematician's Companion* (London, 1739), p. 176.

recommended books likewise turned on occasion to Ward's *Guide*: Cotton Mather in 1726 wrote that for arithmetic and geometry 'an Hill and an Euclid, or, the Young Mathematician's Guide of a Ward, instead of Both, may singularly be commended'.⁴⁵ Charles Hutton's mathematical dictionary of 1795 noted that the *Guide* was 'still in great request, especially with beginners ... [it] has been ever since the ordinary introduction of the greatest part of the mathematicians of this country'.⁴⁶

The reputation of the *Guide* held up well into the nineteenth century. Two pioneers of mechanical computation, Charles Babbage (1791–1871) and Thomas Fowler (1777–1843), both remembered the book fondly. Babbage wrote of rising early at school to study the *Guide*, a book which had particularly struck him;⁴⁷ Fowler's recollection, reported in his son's biography of him, included a period when it was his only mathematical book and

This book, as is usually the case with the *homo unius libri*, he thoroughly mastered, and that without the slightest help from any one. ... [Fowler], after his hard day's work among sheepskins spent half the night poring over his mathematics.⁴⁸

Another reader in this late period was Robert Finch of Balliol College, who acquired a copy in 1802 – aged 18 or 19 – and worked through at least some of Part 1.⁴⁹ But these are the last definite references to Ward's *Guide* in use that I have found, and it seems fair to assume that by the first decade of the nineteenth century – thirty years after the printing of the final impression in 1771 – the book was falling out of use, in favour of new textbooks which deliberately aimed to supersede it. Peter Nicholson, introducing his *Popular Course of Pure and Mixed Mathematics* (1825), remarked that

⁴⁵ Cotton Mather, *Manuductio ad ministerium* (Boston, 1726), p. 53. Compare John Clarke, *An essay upon study* (London, 1731), p. 156.

⁴⁶ Charles Hutton, *A Mathematical and Philosophical Dictionary* (London, 1795), vol. 1, p. 96 (s.v. 'Algebra').

⁴⁷ Charles Babbage, *Passages from the Life of a Philosopher* (London, 1864), p. 19.

⁴⁸ Hugh Fowler, 'Biographical Notice of the late Mr Thomas Fowler of Torrington with some account of his inventions', *Report and Transactions of the Devonshire Association for the Advancement of Science* 7 (1875), pp. 171–178, at p. 172.

⁴⁹ Copy 1771C.

Every mathematician, of the present day, must be aware of the existence of a work, published upwards of a century ago, under the title of “Ward’s Young Mathematician’s Guide;” and many of them, particularly the self-taught, will readily acknowledge their obligations to it in the commencement of their studies.⁵⁰

Nicholson however believed that Ward’s was ‘an imperfect and limited series’ and rendered ‘altogether obsolete’ by this date by ‘the great improvements in the principles of analysis’. His own book excised the rudiments of arithmetic, beginning with algebra, but in what had become the dominating British fashion it included ‘the whole of Euclid’. In 1838, *The Penny cyclopaedia of the Society for the Diffusion of Useful Knowledge* still recommended Ward’s *Guide* as a source of reference on gauging, alongside works by Hutton and Leadbetter.⁵¹ I have found no later commendation.

Ward himself was an obscure figure by this time: a letter in *The New Monthly Magazine* in 1814 requested biographical information about Ward among other deceased mathematical writers, noting that he and they did not appear in Hutton’s mathematical dictionary.⁵² There does not seem to have been any response.

2.2 Individual owners of the Guide

Many individual owners and users marked their copies of Ward’s *Guide*. Nearly every one of the copies I have seen shows some evidence of early use.⁵⁴ Most such marks cannot be dated with precision, but if the *Guide* was indeed falling out of use by the early nineteenth century, it seems reasonable to suppose that most of the marks to be found on individual copies – setting aside modern library stamps and shelfmarks – were made during the eighteenth.

⁵⁰ Peter Nicholson, *A Popular Course of Pure and Mixed Mathematics* (London, 1825), p. i.

⁵¹ *The Penny Cyclopædia of the Society for the Diffusion of Useful Knowledge*, vol. 11 (London, 1838), p. 96, s.v. ‘Gauging’.

⁵² ‘Oxoniensis’, ‘Enquiry respecting deceased mathematical writers’, *New Monthly Magazine* (1 March 1814), p. 126.

⁵⁴ An exception is copy 1713C, which bears no marks of early owners.

Ownership was signalled as it was for any early modern book, either by writing one's name on the title page or endpapers, or more rarely by signing at the end of a completed section of reading.⁵⁵ Some owners also took pains to scrape out or obliterate the names of previous owners. Another possibility was to paste in a bookplate;⁵⁶ bookplates in this sample are mostly associated with libraries or with titled individual owners. I have not seen 'steal not this book' imprecations of the kind often found in early modern books,⁵⁸ but for some owners a title-page declaration of ownership may have served a real practical purpose, discouraging theft or facilitating the book's identification and recovery if mislaid in a busy classroom, home or workplace.

The evidence used in this study allows 45 owners of the *Guide* to be identified. They are listed in Table 1. Even this short list, in which for many individuals we have nothing more than a name and a very approximate date, shows considerable diversity. Owners of the *Guide* spanned the social scale, from king (George III) or duke to joiner. The list includes six titled men, and at least two non-titled landowners. At least seven owners were university graduates, of whom four were clergymen. At least two owners were working-class; one was a naval officer. Two were women.

Table 1: Individual owners of Ward's *Guide*.

For each owner the *terminus ad quem* is highlighted.

Name	Edition owned	Notes	Evidence
Thomas Pelham-Holles		1693–1768; Duke of Newcastle upon Tyne and first duke of Newcastle under Lyme; prime minister, chancellor of Cambridge University.	Auction catalogue, 1769.
Charles Boyle	1707	1676–1731; Earl of Orrery.	Oxford, Christ Church, shelfmark OP.4.14.
Owen Phillipse	1707		Copy 1707C.

⁵⁵ Copy 1724D. Signatures at ends of chapters to show the progress of reading seem to be rare in this type of book; see H.J. Jackson, *Marginalia: readers writing in books* (New Haven, 2001), pp. 21–2.

⁵⁶ Since Ward's *Guide* was usually sold bound I have not examined bindings for the evidence they might provide about ownership.

⁵⁸ See Jackson, *Marginalia*, pp. 24–5.

Lonsdale	1707		Copy 1707B.
Margaret Weld	1709	Possibly a relative of Thomas Weld, below; if so, his mother (b. 1684).	Copy 1709A.
Eugene Aram		1704–1759; philologist and convicted murderer; studied the <i>Guide</i> probably during the 1710s .	⁵⁹
Martin Folkes	1713	1690–1754; Cambridge graduate; President of the Royal Society.	Auction catalogue, 1756.
Thomas Weld	1719	1711–1764; of Lulworth Castle.	Copy 1719A.
Jean Walker	1719		Copy 1719A.
William Minns or Nimm	1719		Copy 1719E.
Samuel Bush	1719	d. 1783; vicar of Wadhurst, Sussex; signature dated 1724 .	Copy 1719D.
Richard Mason	1724		Copy 1724B.
Cooper	1724		Copy 1724A.
John Phillips	1724	Joiner at Chipping Norton.	Copy 1724C.
Thomas Hague	1724		Copy 1724C.
Richard Powell	1724	Died c. 1730.	Auction catalogue, 1730.
Martin Willans	1728		Copy 1728C.
George Wrighte	1728	Of Gothurst; family members of this name died 1725, 1766, 1804.	Copy 1728D.
John Sharp	1728	Died c. 1794; of Warwick.	Auction catalogue, 1794.
W. Gower	1728		Copy 1728E.
Edward Robinson	1724	Signatures dated 1729 –33.	Copy 1724A.
Ralph Cox	1724	Signature dated 1734 .	Copy 1724A.
George Rodway	1734		Copy 1734E.
Thomas Hearne	1734	1678–1735; antiquarian; Oxford graduate; nonjuror.	Auction catalogue, 1736.
Ralph Freeman	1724	Died 1772; of Hamels; prebendary of Sarum; signature as ‘D.D.’, thus after 1741 .	Copy 1724D.
Stephen Green	1734	Born 1725; signature dated 1744 ; at school in Over Kellet, Lancaster.	Copy 1734A.
Viscount Downe	1747	Probably Henry Pleydell Dawnay, 3rd Viscount Downe, 1727–1760.	Copy 1747C.
John Burk or Buck	1747		Copy 1747D.
Thomas Jennings	1747	Signature dated 1749 ?	Copy 1747A.
William Hemsley	1752	Apparently a teacher.	Copy 1752B.
John Hanes or Hawes	1734	Signature dated 1756 .	Copy 1734E.
?Charles Moore	1758		Copy 1758A.
William ?Canter	1758	‘R.N.’	Copy 1758A.
Lord Leigh	1758	Probably Edward Leigh, 5th Baron Leigh (1742–1786).	Copy 1758B.
John Norris	1719	Signature dated 1759 .	Copy 1719C.
W. Gore	1762		Copy 1762B.

⁵⁹ *The genuine account of the trial of Eugene Aram* (Dublin, 1759), p. 32; Nancy Jane Tyson, ‘Aram, Eugene (bap. 1704, d. 1759), murderer and philologist’, in *ODNB*.

King George III	1724	1738–1820; r. 1760–1820; probably acquired second-hand after 1763 .	Copy 1724E.
John Hamilton	1755	Signature dated 1764 ; possibly Sir John, first baronet Hamilton (1755–1835), army officer.	Copy 1755A.
Thomas Taylor		1758–1835; philosopher and translator; saw the <i>Guide</i> aged between 9 and 15, thus around 1767–73 .	⁶⁰
Ann Hippisly	1752	Signature dated 1789 ; this family endowed the Shepton Mallet mission (below).	Copy 1752C.
George Turnbull	1719	Signatures dated 1789–90 ; of Lempitlaw Eastfield; possibly born c. 1772.	Copy 1719E.
Thomas Fowler		1777–1843; of Great Torrington; inventor and pioneer of mechanical calculation; studied the <i>Guide</i> probably from around 1790 .	Fowler 1875.
Stephen Peter Rigaud	1709	1774–1839; signature dated 1796 ; later Savilian Professor of Astronomy.	Copy 1709B.
Robert Finch	1771	1783–1830; signature dated 1802 ; MA of Balliol; antiquarian.	Copy 1771C.
Charles Babbage		1791–1871; pioneer of mechanical computation; studied the <i>Guide</i> at school in Enfield probably from around 1804 .	Babbage 1864.

Unfortunately there are very few cases in which annotations of any substance can be confidently identified as the work of a named individual. Nor is there any discernible chronological pattern to the type of marks found in the book.

In three cases we know the age of the individual when the copy of the *Guide* was obtained: Stephen Green, in 1734, and Robert Finch, in 1802, were both 18 or 19; Stephen Rigaud, in 1796, was 22. Thomas Fowler was studying the *Guide* around the time he became an apprentice at 13. Charles Babbage studied the *Guide* soon after starting school: we do not know his exact age at the time, but he was perhaps also around 13. In several more cases a lower bound or a reasonably probable approximation can be given, usually by considering the imprint date of the copy owned: Thomas Weld was at least 8 and Hamilton possibly 9; Thomas Pelham-Holles at least 14; Leigh at least 16; Bush at Oxford and probably at least 16; Turnbull possibly 17 or 18. Viscount Downe was at least 20; Martin Folkes at least 23; Boyle at least 31 and Ralph Freman no younger; Thomas Hearne at least 56. The nature of the *Guide* was that it could be profitably used by readers at various levels of existing mathematical attainment: what this evidence shows is that it may not have been

⁶⁰ *British and Irish public characters of 1798* (Dublin, 1799), p. 73; Andrew Louth, ‘Taylor, Thomas (1758–1835), philosopher and translator’, in *ODNB*.

primarily, and certainly was not exclusively, acquired by beginning schoolchildren aged around eight; individuals at the age of starting grammar school or apprenticeship used it, as did those in their late teens or beyond. Hearne, who obtained his copy aged at least 56, may have obtained the book for reasons different from other owners: but the copy he owned was of the 1734 edition and can have been no more than a year old when he acquired it (he died in 1735); it cannot have been of antiquarian interest.

In only one case do we have evidence for the period over which an individual studied the *Guide*: Edward Robinson dated his copy on 13 March 1728/9 and again on 12 April 1733; by 1734 it belonged to Ralph Cox.⁶¹ Thus it was possible for an individual's engagement with the *Guide* to continue over four years; whether this was usual it is impossible to say.

Evidence for the location of these owners is very scanty, and does not really tell us more than the other evidence for the *Guide*'s circulation discussed above. But some information about the environments in which the book was used can also be gleaned from these copies. The joiner, John Phillips's, copy is visibly dirtier than most, and the numerous unidentifiable particles of dirt wedged in its binding could naturally be interpreted as sawdust or wood shavings. One copy contains marginal drawings which hint at an inadequately supervised classroom; it also bears the mark of a major ink spillage, which points in the same direction. Another seems to have been caught in the crossfire of an ink fight, with streaks of ink in various directions across one opening. Few of the copies I have seen received abuse as serious as this, although a few were used as scrap paper: particularly their endpapers. We find blank areas of pages used to test pens, to practice a signature, or to record personal biographical information, and we find marginal doodles of various kinds. Some geometrical or numerical doodles might arguably relate to mathematical exercises; but arithmetical working is probably just as likely to record a moment of domestic accounting as to have anything directly to do with study of the *Guide*. Notes and working may more normally have been made on separate sheets, and those sheets could have been inserted into the book and now lost. Sometimes ink smudges in copies of the book seem to suggest that something like this took place, and can hint that sections of the book not otherwise

⁶¹ Copy 1724A, front endpaper and p. 142, rear endpaper, frontispiece.

marked were in fact studied.⁶² Folded-down pages can also show that a copy was studied when other evidence is lacking, but these are hard to interpret.

Other drawings and doodles are clearly irrelevant to the subject of Ward's *Guide*, such as the stick-men and -dogs in copy 1769A, apparently drawn by a child, and presumably one who was not closely supervised while using the book. Another, apparently older, reader found a more inventive possibility. Some of Ward's explanations of infinitesimal techniques included diagrams in which geometrical shapes were split up using several parallel horizontal lines. This reader reinterpreted one such diagram as a musical stave, and added a clef and some notes to it.⁶³

A copy of the *Guide* could be recycled in still more drastic ways. Two copies (1713B and 1740B) were used to press flowers; their imprints are still clearly visible, and in a few openings fragments of petals still adhere to the pages. For some owners the book was valued not for its text but for its physical size and weight.

3 Using the *Guide*

3.1 Corrections

Many copies, though, show clear evidence of close engagement with the text. The editions of 1707, 1713 and 1731 contained, at least in some copies, printed lists of errata, introduced thus in 1707:

⁶² Copy 1747D is particularly rich in such smudges, but most of the copies I have seen possess at least a few.

⁶³ Copy 1724B. Seth Lerer provides a discussion of the meanings of such apparently wanton defacements across the whole early modern period, and their sometimes juxtaposition with children's expressions of devotion, arguing that 'Commentaries, signatures, and scribbling defacements—together with fictional representations of young people writing in books—illustrate relationships among canonical authority, playful subversion, commodity value, and archival preservation that all contribute to (and may critique) our current fascination with book history as a discipline': Seth Lerer, 'Devotion and Defacement: Reading Children's Marginalia', *Representations* 118 (2012), pp. 126–53 at p. 126. See also William H. Sherman, 'What did Renaissance Readers Write in their Books?' in Jennifer Andersen and Elizabeth Sauer (eds), *Books and Readers in Early Modern England: Material Studies* (Philadelphia, 2002), pp. 119–137 at p. 130 on the irrelevance of some marks.

If the *Reader* were but *Sensible* of the *Great Care* and *Difficulty* that unavoidably attends *Correcting* the *Press* to *Books* of this *Nature*; he would the more *readily Excuse* and *Amend* the following *Errata*'s.

There the list was followed by the admission of a larger error: 'Note, at *Question 5. Page 93.* the *Operation* or *Work* is all *Mistaken*; for the *Answer* should be only 13 *Ounces*.'⁶⁴ In the preface, too, Ward noted that the book was surely not 'without Imperfections' and hoped 'the Reader will excuse and pass over' these.⁶⁵ By drawing attention to the possibility of error, and in particular by acknowledging that not just the printer but the author were capable of making mistakes, Ward seems almost to have invited readers to get involved with the text.⁶⁶ Many of them did.

The majority of the marks made on these books, indeed, were attempts to improve its mathematical content. One numeral was substituted for another, one algebraic letter for another. Cross-references to numbered lines of algebraic working were corrected, missing symbols were filled in. The density of such corrections varied from just one or two in a copy up to many dozens. At nearly 500 pages, the *Guide* and its multiple printings provided a lot of opportunity for printers to make new errors as well as to correct old ones. I have seen only one case in which an owner worked systematically through the printed list of errata making the corrections Ward suggested.⁶⁷ Instead, these emendations were nearly always made on the initiative of others: readers themselves, or their teachers.

Such readers' marks have a history; according to Seth Lerer 'the childish habit of annotating' was already 'entrenched by the mid-fourteenth century'.⁶⁸ Schoolchildren and students were taught how to mark up their books, and pedagogues of the Renaissance – including Erasmus – routinely advised on the subject. But much of the extant advice concerns the identification of literary qualities, the extracting of information or the marking of passages for copying into a commonplace book, rather

⁶⁴ Ward, *Guide*, (1707), Mmm3^v.

⁶⁵ Ward, *Guide*, (1707), A4^v.

⁶⁶ Seth Lerer, 'Errata: print, politics and poetry in early modern England' in Kevin Sharpe and Steven N. Zwicker (eds), *Reading, society, and politics in early modern England* (Cambridge, 2003), pp. 41–71 at p. 42.

⁶⁷ Copy 1709B.

⁶⁸ Lerer, 'Devotion and Defacement', p. 127.

than correction or even supplementation such as we will see below.⁶⁹ H.J. Jackson, for example, in her magisterial study of marginalia from the eighteenth to the twentieth century, finds that ‘the one consistent factor in virtually all the notes, is personal applicability ... all these notes designate points at which readers became aware that the subject matter of the book intersected their own lives and their own areas of competence’.⁷⁰ It is difficult to see that such considerations apply in the case of mathematical correction and emendation. Instead we find a different pattern.

Most readers confined their corrections to faults in the numbers or the algebra, leaving unchanged even quite obvious verbal errors: repetition of a word, for instance. Presumably mathematical errors were easier to detect or to correct – because of the logical structure of numerical calculations and algebraic proofs, and the frequency of repetition or modified repetition within them – or seemed to readers to matter more than similar faults in the words.

Annotations of this kind are perhaps a byproduct of precisely the kind of close reading Ward anticipated for his text, in which the correctness and coherence of calculation, algebraic manipulation and logical structure were at a premium (and mattered more than mistakes in the words). Very little systematic work has been done on this, but studies of other collections have tended to suggest that practical texts were often annotated in similar ways.⁷¹ Matthew Grenby’s work on children’s books finds patterns of ‘intensive, active and interactive use’ of didactic (and other) books, comparable to the patterns of close but selective engagement found in this study.⁷²

Yet mathematical working also presented distinctive problems for emenders. Ward’s pages were complex and not always easy to interpret. Their contents included prose, numerical or algebraic working, geometrical diagrams, and occasionally commentary, tables, or ‘Rules’ set off from the main text, as well as headings and numbering of paragraphs or sections. As in any early modern book, the head and foot of the page also bore running heads, page numbers, catchwords and sigla. Annotators either

⁶⁹ See Jackson, *Marginalia*, pp. 48, 75; compare Heidi Brayman Hackel, “‘Boasting of silence’: women readers in a patriarchal state” in Sharpe and Zwicker, *Reading, society, and politics*, pp. 101–121, at p. 108.

⁷⁰ Jackson, *Marginalia*, p. 176.

⁷¹ Colclough, *Consuming texts*, pp. 79–80; see also Jackson, *Marginalia*, p. 75.

⁷² M. O. Grenby, *The Child Reader 1700–1840* (Cambridge University Press, 2011), pp. 226–35.

added to the complexity by placing their corrections in the margins, producing a page on which the numbers and symbols were correct but improperly laid out, or risked illegibility by overwriting the print.⁷³ Many corrections are in fact hard to interpret.

Further, it is not completely clear in what circumstances such corrections were made or what function they served in a mathematical textbook. A self-teaching reader like Fowler may have envisaged returning to the same passages again and have wished to avoid repeating the effort of noticing distracting errors. But I am not convinced that the sporadic corrections we find in many copies of Ward always signified a serious intention on the part of their writers to work through the same passages again.

I suspect that correction served a symbolic function as well as a practical one, serving to assert intellectual ownership of the material corrected:⁷⁴ I have understood this algebra, I have done this calculation, I have used this table. It was a way to note to a putative future reader – oneself, a teacher, a future owner of the book⁷⁵ – that one had understood the material. (Rarely, a simple tick at the end of certain exercises served a similar function, recording – I believe – that those exercises, perhaps set by a teacher, had been completed.)

Perhaps, too, some readers noted errors with the intention of informing others. John Robertson, for example, noted a mistake in Ward's *Guide* in his 1739 *Compleat treatise of mensuration*;⁷⁶ so did one C. Morton in the *London Magazine* in 1759.⁷⁷ The latter was particularly concerned that a mistaken theorem on interest calculations seemed to have been widely reproduced in other textbooks: works by Thomas Simpson, Thomas Dilworth, Francis Walkingame, and others were mentioned, giving a sense of how widely this writer believed Ward's methods – and his mistake – to have circulated. A teacher might have marked up a copy for similar reasons, intending

⁷³ See Matthew Daniel Eddy, 'The Shape of Knowledge: Children and the Visual Culture of Literacy and Numeracy', *Science in Context* 26 (Special Issue: Knowledge in the Making) (2013), pp. 215–45.

⁷⁴ See Jackson, *Marginalia*, p. 90: she proposes that 'all marginalia are extensions of the ownership inscription, which itself expresses the primary impulse of claiming the book as one's own. Every note entails a degree of self-assertion, if not of aggression.'

⁷⁵ See Jackson, *Marginalia*, p. 100.

⁷⁶ John Robertson, *A compleat treatise of mensuration* (London, 1739), p. 160. See Ward, *Guide* (London, 1658), p. 421, where this report was acknowledged and the error corrected.

⁷⁷ C. Morton, 'A Material Error Corrected' (letter), *The London Magazine, Or, Gentleman's Monthly Intelligencer* 28 (May 1759), pp. 251–2.

to inform students of errors or even dictate their correction before they caused difficulties.⁷⁸

The distribution of corrections in these copies also reveals something about the way the book was used. In few copies were corrections made in all five parts of the text; in no copy were corrections made systematically in many consecutive passages and exercises. Some parts were ignored by most readers: the first rudiments of arithmetic, in particular, show less evidence of having been read than any other part of the book.⁷⁹ A fairly typical example is copy 1719B, in which Part 1 is emended quite frequently, with correction of numbers and some supplementary explanations and cross-references, while parts 2 and 4 received only occasional emendation.

Thus it seems the book was typically studied quite selectively. Of the copies I have seen, about 45 show fairly clear evidence for which parts were studied by a single reader. Of those 45, nearly every reader read some of parts 1 and 2 (arithmetic and algebra): I have seen only one marked copy in which the reader apparently ignored these chapters altogether. They were divided between those who read both, those who read just the arithmetic, and a minority who read just the algebra. Meanwhile, perhaps half of readers studied some of the geometrical material (parts 3–5); most, but not all, were those who had read part 2 on algebra. Of the different possible choices between parts 3, 4, and 5 none stands out as much more or less popular than the others. Only a handful of readers paid any attention to the appendix on gauging, none to that on logarithms and trigonometry.

Within the sections that were studied, most readers do not seem to have worked through every exercise but to have dipped in, working through selected examples only. Unfortunately we do not know enough about the circumstances in which particular copies were read to know whether these patterns of selective engagement were the result of personal choice by learners or were directed by their teachers. Such a pattern certainly could have been imported from habits of study and reading in other fields. Robert Darnton has found a similar pattern in early modern English reading

⁷⁸ Copies 1752B and 1771B.

⁷⁹ Only three copies (1709B, 1734A, 1752B) have any corrections at all in the first thirty pages, and in one of those (1709B) the correction derives from the printed errata.

habits more generally: ‘Early modern Englishmen’, he concludes, did not read texts from beginning to end but ‘in fits and starts’ jumping ‘from book to book’. They ‘broke texts into fragments and assembled them into new patterns by transcribing them in different sections of their notebooks’.⁸⁰

3.2. *Supplementing, editing, and restructuring the Guide*

Ward’s *Guide* could also be fragmented and restructured. Less frequently than they corrected it, owners of the *Guide* annotated it more drastically, supplementing Ward’s explanations or his mathematical working, adding new examples and working, or emending the book’s logical structure by correcting cross-references or inserting new ones. For example, a reader of copy 1724A supplemented the solution of a set of equations by writing ‘the 1st Term’, ‘the 2d Term’, and so on, beside the appropriate lines of algebra.⁸¹ Again, a reader of copy 1724C copied out a short section of Ward’s working for one problem in the margin, replacing Ward’s decimals with fractions. Reaching a more accurate result the reader then wrote ‘This proves the superiority of fractions to decimals’.⁸²

Another related practice was supplementation of the contents page or the construction of a manuscript index;⁸³ one reader marked up the printed index apparently in order to serve a similar function.⁸⁴ Occasionally readers inserted cross-references to other books.⁸⁵

As with corrections, such supplementing and re-working of Ward’s material was almost invariably carried out sporadically rather than systematically. The heaviest

⁸⁰ Colclough, *Consuming texts*, p. 31, quoting Robert Darnton, ‘Extraordinary Commonplaces’, *New York Review of Books*, 21 December 2000, pp. 82–7, at p. 82. Compare also the tables in Grenby, *The Child Reader*, pp. 222–3, showing the number of pages read per session by two child readers, with the discussion on pp. 221, 224–5.

⁸¹ Copy 1724A, p. 190.

⁸² Copy 1724C, p. 222.

⁸³ An example is copy 1771B, with notes on the rear endpaper including page references. See Jackson, *Marginalia*, 37–9 on manuscript indexes. Roger E. Stoddard, *Marks in Books, illustrated and explained* (Cambridge, MA, 1985), p. 41 gives an example.

⁸⁴ Copy 1758A. Compare the system of annotation/indexing devised by the exciseman John Dawson (1692–1765): Stephen Colclough, ‘“R.R., A Remarkable Thing of Action”: John Dawson (1692–1765) as Reader and Annotator’, *Variants: The Journal of the European Society for Textual Scholarship* 2/3 (2004), pp. 61–78, at pp. 67–69.

⁸⁵ Copy 1771B, with references to Newton’s *Universal Arithmetick* and to a previous edition of Ward’s *Guide*.

annotator I have come across was one William Hemsley, possibly a teacher, who made fairly dense emendations to every part of the book except the final appendix on logarithms. They included rudimentary matters such as glosses for the names of arithmetical signs, as well as algebraic translations of verbal rules, supplementary cross-references, corrections of figures and algebra, and supplementary working. He used the rear end-paper for longer supplements, for which he gave cross-references within the text.⁸⁶

Additions and restructurings tended to overlay Ward's mathematical narrative with another, created by the owner of the book or by a teacher. In such cases the reader's role in effectively collaborating with Ward could become quite considerable, and the title-page signature could in such a case become something like a declaration of joint authorship.⁸⁸ As in the case of correction, Ward himself, and the subsequent editors of the *Guide*, pointed the way, by occasionally providing marginal explanations for algebraic working, or remarking on differences compared with a previous edition of the text.

As mentioned above, it was also common in this period for printed books to be the source of passages copied out in manuscript: to be reduced to a set of fragments which would take on new meanings in new contexts, as in the early modern commonplace book. Mathematical textbooks were no source of commonplaces, but mathematical classroom practice does provide a close analogy with commonplacing. It was usual in this period for students to copy sections from textbooks into their exercise books, producing a volume of mathematical exercises which could come from a range of different sources and might owe their arrangement and handling to the student's initiative or to a teacher.⁸⁹ The teacher and author Francis Walkingame, introducing his own collection of arithmetical problems in 1751, evoked a 'Master' who 'takes upon him that laborious (tho' unnecessary) Method of writing out the

⁸⁶ See Jackson, *Marginalia*, p. 46: 'Bernard M. Rosenthal's descriptions of 242 early annotated books include many examples of students' notes, including not only interlinear and explanatory glosses and paraphrases but also complete commentaries dictated by their instructors.'

⁸⁸ See H.J. Jackson, "'Marginal Frivolities': readers' notes as evidence for the history of reading' in Robin Myers, Michael Harris and Giles Mandelbrote (eds), *Owners, Annotators and the Signs of Reading* (London, 2005), pp. 137–52, at p. 139.

⁸⁹ John Denniss, *Figuring it Out: Children's Arithmetical Manuscripts 1680–1880* (Oxford, 2012), p. 5.

Rules and Questions in the Children's Books', and also the situation in which the children did the copying themselves but had only one book: 'where there are several Boys in a Class, some one or other must wait till the Boy who first has the Book finishes the writing out those Rules or Questions he wants'.⁹⁰

As John Dennis remarks, 'the task of matching each manuscript with the corresponding textbook would be an immensely time-consuming undertaking', and I have not identified an exercise book in which Ward's *Guide* was used in this way.⁹¹ Copy 1771D, however, shows clearly that such things were done with Ward: as well as noting carefully which sections had been 'done' and (unusually) admonishing Ward where he is 'wrong', a reader of this copy placed pencilled lines and sometimes quotation marks in the margins beside what were surely sections intended for quotation in an exercise book. There can be little doubt that such a widely-used textbook was subjected to this kind of fragmentation and reinterpretation, and that Ward's words and examples took on new roles in many a student exercise book during the eighteenth century.

Such extracts could also be put to public use. Fragments from Ward's *Guide* appeared in solutions sent in to the *Ladies'* and the *Gentlemen's Diary*, for instance, and elsewhere in the periodical literature on mathematical problems.⁹²

4 Conclusions

Owners of Ward's *Guide* were diverse as to class, gender and geographical location. They valued different parts of the book's content and they responded in ways ranging from abuse and re-use of the book as scrap paper to detailed correction, annotation and intellectual engagement verging on joint authorship. Many readers used copies of the *Guide* that had been marked by themselves or by others; some re-used or commented on fragments of Ward's material publicly, or provided annotations intended for the use of others.

⁹⁰ Francis Walkingame, *The Tutor's Assistant* (London, 1751), a2^r-v.

⁹¹ Dennis, *Figuring it Out*, p. 9.

⁹² For example, 'Philosophaster', 'An Algebraic Query', *London magazine, or, Gentleman's monthly intelligencer* 31 (April 1762), p. 215; *The gentleman's diary... 1753* (London, 1753), p. 39.

If the range of things owners did with copies of Ward was fairly wide, it was different from what they did with other prose works in this period. Criticism in the literary sense – or the expression of judgements of merit – are altogether absent from the annotations I have seen. So are the ‘irritable expostulations’, which Jackson finds to have been perhaps the most common form of reader’s marks.⁹³ So are such sophistications as directly addressing the author, addressing the author as though oneself, or even addressing oneself explicitly.⁹⁴ Annotators of Ward do not seem to have felt that opinion was at stake when they engaged with – and wrote on – his book. Instead they engaged in depth – but very seldom in breadth – with the mathematical content of the book: its accuracy, its correctness, its logical structure.

Studies of ‘actual readers’ have enjoyed something of a vogue over the last decade or so, but it is often held that a reliance on the type of evidence cited here – marks in surviving copies – is problematic. On the whole, annotated books are unusual: a study by William H. Sherman seems to be fairly typical in finding that just over 20% of the Renaissance books surveyed had manuscript notes.⁹⁵ Heidi Brayman Hackel comments:

a reliance upon marginalia as evidence does, of course, leave many early modern readers invisible: those whose books have not survived, those who never owned books, those who could read but not write, those who simply never felt inclined to annotate their books, and indeed those who read their books to pieces.⁹⁶

In the present case these problems are mitigated in part by the fact that, judging by the evidence used in this study, nearly all surviving copies of Ward’s *Guide* bear marks made by their early readers: a sharp contrast with early modern books generally. I do not believe that the processes of survival and destruction have favoured marked

⁹³ Jackson, *Marginalia*, p. 164.

⁹⁴ See Jackson, *Marginalia*, pp. 87–8.

⁹⁵ William H. Sherman, ‘What did Renaissance Readers Write in their Books?’ in Jennifer Andersen and Elizabeth Sauer (eds.), *Books and Readers in Early Modern England: Material Studies* (Philadelphia, 2002), pp. 119–137 at p. 122.

⁹⁶ Hackel, ‘Boasting of silence’, p. 107.

copies; libraries and collectors generally seem to favour clean copies.⁹⁷ Yet even George III, acquiring a copy of the *Guide* some time after 1760, acquired a copy with a substantial number of marks from previous owners.⁹⁸ Thus it would seem that most of the copies of Ward's *Guide* that were produced were sooner or later marked by readers.

This does not imply that every reader was a marker. Many copies will necessarily have passed through more than one set of hands during the eighteenth century, but few in fact show clear evidence of marking by more than one owner. Some readers may have read borrowed copies or library copies, or have had other reasons for refraining from marking (there is some reason to believe that early modern women marked books less than men).⁹⁹ It does, though, imply that marked copies of Ward's *Guide* were normal in the eighteenth century, that writing in this book was normal, and that many readers must have studied copies of it in which other hands than Ward's could be seen.¹⁰⁰

Thus even for normal readers Ward's book represented an opportunity to get involved in active, detailed negotiation about what the text should say, how it should be organised and how different passages from it could be made to take on lives of their own in exercise books or even in print. An opportunity to use the skills Ward's book taught to speak back to the book and improve it. A suggestive example is copy 1719E, in which one reader made quite extensive annotations including supplementary material on the endpapers, and another reader made corrections to those annotations.

⁹⁷ See Jackson, *Marginalia*, p. 235: 'There may well be rare book collections that would show a book the door if they found a note in it.' It has long been a matter of remark that children's books and textbooks tend to get destroyed or, if not destroyed then spoiled to the point where preservation in a library is unlikely. See Karen Sanchez-Eppler, 'Marks of Possession: Methods for an Impossible Subject', *Transactions and Proceedings of the Modern Language Association of America* 126 (2011), pp. 151–59 at pp. 151–3

⁹⁸ Copy 1724E. Much of the King's large (c. 65,000 volumes) library was acquired at book sales, and the marks presumably predate his acquisition of the copy, though this is not certain.

⁹⁹ See Hackel, 'Boasting of silence', p. 107 for the general paucity of women's marginalia, and her article as a whole for some reasons, including acceptable codes of women's literacy and readership, for this.

¹⁰⁰ Jackson, 'Marginal Frivolities', p. 144: in the Romantic period 'writing in books was normal and most readers did it on certain occasions but few if any made an invariable practice of it. I think all readers, as long as they were the owners, did write in books sometimes.'

And, while reading a mathematics textbook is not like reading a novel – Ward cannot plausibly have been read aloud in a domestic setting, or read communally at a coffee-house – uses of the *Guide* could nonetheless be social. Annotations had the potential to demonstrate to other readers the possibility that Ward’s text might be wrong, incomplete, or inadequately structured,¹⁰¹ and that one copy might not be quite as good as another.¹⁰² Some marks may have been made with other readers or with teachers specifically in mind; some may have been made at the direction of a teacher. Thus classrooms (and perhaps mathematical clubs) offered a setting for a social process that could involve not just Ward and the individual reader but editors, teachers, other published authors and previous owners of a particular copy of the book.

We should not be very surprised by this; after all, the point of a textbook like Ward’s *Guide* is to teach techniques that will be put to use by readers in a variety of situations, some of them involving other people. But this study has provided a salutary reminder that reading or studying even a technical book like Ward’s in the eighteenth century was not a passive assimilation of a stable authoritative text: like other forms of reading, it had something of the character of joining in a conversation.

¹⁰¹ See Jackson, *Marginalia*, p. 241; also Steven N. Zwicker, ‘The constitution of opinion and the pacification of reading’ in Sharpe and Zwicker, *Reading, society, and politics*, pp. 295–316 at p. 298: ‘What we have come to appreciate from recent work on the various modes of manuscript and print publication in the Renaissance is how active were the processes of early modern reading, how intimate the relations between writing and reading, how implicated in the dynamic of production was consumption.’

¹⁰² Lerer, ‘Devotion and Defacement’, p. 146; see also Stephen G. Nichols, ‘On the Sociology of Medieval Manuscript Annotation’, in Stephen A. Barney (ed.) *Annotation and Its Texts* (New York, 1991), pp. 43–73, esp. pp. 47–53.

*Appendix: Copies seen in this study*¹⁰⁷

- 1707A** (ESTC T69160): London, British Library, shelfmark 1485.tt.46. Online: GDN CW107431071.
- 1707B** (ESTC T69160): Oxford, Bodleian Library, shelfmark Vet. A4 e.2118.
- 1707C** (ESTC T69160): Oxford, Bodleian Library, shelfmark Opie B 347. Microfiche: Opie 008:180.
- 1709A** (ESTC T132879): London, British Library, shelfmark 8531.bbb.24. Online: GDN CW110820665.
- 1709B** (ESTC T132879): Oxford, Bodleian Library, shelfmark Rigaud e.418.
- 1713A**: London, British Library shelfmark 8505.de.46. Online: GDN CW109329737.
- 1713B**: Oxford, Radcliffe Science Library, shelfmark 1874 e.10.
- 1713C**: London, British Library, shelfmark RB.23.a.12123.
- 1719A**: London, British Library, shelfmark 8529.bbb.22. Online: GDN CW109582942.
- 1719B**: Ann Arbor, MI, University of Michigan, shelfmark QA35.W259 1719. Online: HT mdp.39015063871985.
- 1719C**: Oxford, Bodleian Library, shelfmark Vet. A4 e.1197.
- 1719D**: Oxford, Wadham College, shelfmark J.29.3.
- 1719E**: London, British Library, shelfmark 1609/1968.
- 1724A**: London, British Library, shelfmark 1608/1979. Online: GDN CW109849222.
- 1724B**: Ann Arbor, MI, University of Michigan, shelfmark QA35.W259 1724. Online: GB 1dg2AAAAMAAJ; IA youngmathematic02wardgoog; HT mdp.39015063871993.
- 1724C**: Oxford, Radcliffe Science Library, shelfmark 1874 e.96.
- 1724D**: Oxford, All Souls College, shelfmark 8:SR.59.c.31.
- 1724E**: London, British Library, shelfmark 49.a.9.
- 1728A**: London, British Library, shelfmark 8529.bb.46. Online: GDN CW108924693.
- 1728B**: Ann Arbor, MI, University of Michigan, shelfmark QA35.W259 1728. Online: HT mdp.39015063872009.
- 1728C**: Oxford, Bodleian Library, shelfmark Vet. A4 e.2186.
- 1728D**: Oxford, Bodleian Library, shelfmark Opie B 348. Microfiche: Opie 008:181.
- 1728E**: Oxford, Worcester College, shelfmark J.J. π. g.
- 1731A**: Dublin, National Library of Ireland, call no Dublin 1731(27). Online: GDN CB127937163.
- 1731B**: University of Lausanne, shelfmark unknown. Online: GB MGkVAAAAQAAJ.
- 1734A**: British Library, shelfmark 1508/858. Online: GDN CW109850743.
- 1734B**: Lyon, Bibliothèque municipale de Lyon, call no. 342376. Online: GB 1LpdeRaFGoEC.

¹⁰⁷ Abbreviations:

IA The Internet Archive, <http://archive.org>, document ID
GB Google Books, <http://books.google.co.uk>, document ID
GDN Eighteenth-Century Collections Online, <http://gale.cengage.co.uk/product-highlights/history/eighteenth-century-collections-online.aspx>, Gale Document Number
HT Hathi Trust Digital Library, <http://www.hathitrust.org>, document ID
Opie The Opie collection of children's literature [microforms] (Ann Arbor, MI, 1990–2004)

1734C: Ann Arbor, MI, University of Michigan, shelfmark QA35.W259y 1734. Online: IA youngmathematic00wardgoog; HT mdp.39015063872025.

1734D: Oxford, private collection.

1734E: Oxford, Bodleian Library, shelfmark Vet. A4 e.3267.

1734F: London, British Library, shelfmark 1484.ee.26.

1734G: Oxford, Lincoln College, shelfmark N. 7. 20.

1740A: London, British Library, shelfmark 530.f.10. Online: GDN CW108709338.

1740B: Oxford, private collection.

1747A: Oxford, Bodleian Library, shelfmark Vet.A4 e.2563. Online: GDN CW110035875.

1747B: Cambridge, MA, Harvard University, shelfmark KE 11231. Online: HT hvd.hw234v.

1747C: Ann Arbor, MI, University of Michigan, shelfmark QA35.W259y 1747. Online: HT mdp.39015063872033.

1747D: London, British Library, shelfmark 1509/4645.

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